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THE FARMER'S DIGEST

FORT ATKINSON, WIS

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The **Farmer's Digest**

Volume 20 **December 1956** **Number 6**

Should You Stay On The Farm?

You have to make $100 a week in town to compare with $67 on the farm . . .

Condensed from Michigan Farm Economics

James Nielson

IF YOU WERE a young man, 18 to 21 years old, would you go into farming today? Some 4,000 farm boys in Michigan alone face up to this question each year.

No more than 2,000 to 2,500 new farmers are needed annually to replace those who retire or quit farming in Michigan. The rest must find work off the farm to earn satisfactory incomes.

In making the decision as to whether or not to cast one's lot in farming, a person must consider many things. These include: the type of work to which the person is best suited and which he likes the best, family goals and desires, income needs of his family, liking for rural versus city life, and the problems of getting the capital, education, and training for farming.

In the table following, a full-time farmer is compared to a full-time wage earner on eight points largely related to income.

Average net farm income in Michigan varies by area from a high of $4,722 per year to a low of $1346. Average is $2871. The figures are the averages from about 500 farmers who keep records in cooperation with the Michigan State University. They are better than average commercial family-type farms which in 1955 had an average of 234 total acres, a labor force of 1.7 men, and a capital investment of about

Reprinted from Michigan Farm Economics, Michigan State College, East Lansing

$45,000 based on current market values.

Net farm income is what is left after cash expenses, depreciation allowance, and an estimated value of unpaid cash receipts, and after adjustments are made for changes in inventories.

From net farm income the farm family must pay these costs: income and social security taxes, costs of family living, interest and principal payments on debts, new capital purchases, and, if possible, additional provisions for retirement. These farm income figures assume full ownership. If a person were operating on a 50-50 crop and livestock share lease, for example, his share of the income would be about half of these figures.

Average weekly earnings of wage earners in Michigan as compiled by the Michigan Department of Labor vary from $47 per week to $101, depending on the area and the type of work. The national average industrial wage is now $2.02 per hour. Wage earners in Michigan receive wages well above the national average.

The weekly earnings represent the wage earner's gross pay. From this, he must pay: income and social security taxes, costs of family living, union dues (in most cases), insurance and retirement contributions, and possibly other provisions for retirement.

The figures are for employed workers only. Available labor statistics show that for the country as a whole, wage earners lose a minimum of 2 to 3 weeks' pay each year due to layoffs and work stoppages. Michigan wage earners lose more time through layoffs and work stoppages than the average U.S. worker.

Depending upon the kind of farming operation which they carry on, farm families may have milk and other dairy products, eggs, poultry, meat, fruit and vegetables which they produce and eat on the farm. Survey records on 400 Michigan farms show that the farm value of home-used products averages around $400 per family. The same products would cost nearly twice as much at retail. Some wage earners have a small vegetable garden, but most produce little of the food they eat.

Whether a farmer owns or rents, he has the use of a house on the farm. The wage earner pays rent ranging from $30 per month on up to $125 or more per month. Or if he buys a home, he finds that the unrecoverable cash costs of owning a home are about the same as if he rents. If the farmer is an owner, he has cash costs of repair and upkeep on his home.

The farmer usually lives on his

	FARMER	WAGE EARNER
1. What does he get paid for?	One. Labor — about 57 hours per week Two. Capital — about $45,000 Three. Management	One. Labor — about 40 hours per week
2. How well does he get paid?	See above	See above
3. Range in income from person to person	$35,000 difference in net farm income between the highest and lowest of 545 farm account farms	Some differences in earnings by industry, area, or skill; in general, much less spread between highest and lowest paid wage earners
4. Form in which income is received	One. Cash Two. Capital accumulated in the form of farm property Three. Farm products used at home Four. Use of house on the farm	One. Cash wage Two. "Fringe benefits" such as vacations with pay, unemployment compensation, retirement benefits
5. Time needed to reach maximum earning power	About 10 years because of the need to accumulate capital and develop managerial skills	Much less time
6. Provisions for retirement	One. Social Security Two. Capital accumulated while farming	One. Social Security Two. Retirement program connected with job
7. Variations in income over time	Go up faster in good times; go down faster and further in bad times	More stable
8. Bad years — caused by	One. Crop failures Two. Disease outbreaks Three. Cost - price squeeze Four. Sickness, accident	One. Shorter work week Two. Layoff Three. Sickness and accident
Alternatives	One. Produce more for home use Two. Put off capital purchases Three. Postpone debt retirement Four. Collect sickness or accident insurance Five. Look for work off the farm	One. Collect unemployment compensation Two. Collect sickness or accident insurance Three. Look for another job

farm, whereas the wage earner travels from 2 to 10 miles or more to and from work each day, facing cash transportation costs. Of course the farm family must drive to town to take care of farm and personal business. The farmer deducts transportation costs incurred in connection with the farm business in arriving at net income.

Federal income taxes apply to money income only. Thus the farmer does not pay income tax on the portion of his income which is received in the form of home-used products and the use of a house on the farm. If the value of these two items were $1,500, a person in the 20 per cent bracket would pay $300 more income tax if he bought these items from his weekly earnings as the wage earner does.

A farmer with a net farm income of $5000 would have to earn $135 a week to have a comparable living in town. A farmer with $4500 net income would have to earn about $123 per week. A farmer with $4000 net income would have to earn $110 per week. A farmer with $3500 net income would have to earn $100 a week. A farmer with $2500 would need to earn about $75 per week. Even a farmer with $2000 net income would need to earn about $53 a week to be as well off.

About one-half the total corn produced is marketed through hogs.

These figures are based on the assumptions that: (1) The farm family uses $400 worth of home-raised products, (2) wage earners pay rent (which is related to their incomes) varying from $30 per month at the lower income levels to $125 at the higher levels, and (3) it costs the wage earner $150 per year to drive to and from work.

Malthus Theory Proving Wrong

Dr. Malthus . . . the 17th century English gentleman who predicted the world would soon be over-populated and suffer from lack of food . . . becomes more wrong with each passing year. For the third year in a row, the world has increased food production faster than it has increased population, and set all-time records. Since pre-war, population has gone up 1 %. Food production has increased a little in Communist countries, and 25% in the non-Communist world, according to the USDA Foreign Agriculture Service.

You Can Get What You Need

If you organize your community, then compete, you will find the results most rewarding . . .

Condensed from Farm Journal

John Strohm

DRIVE in any direction out of Asheville, N. C., and in the coves and valleys of the Great Smoky Mountains and you'll find evidence that something remarkable has been happening in this once run-down farming area. In neighborhood after neighborhood, houses shine with new paint. Pastures, once badly eroded, are now lush and green. Cattle are sleek, crops well tended.

These communities—more than 100 of them in the 16-county area around Asheville—have rediscovered a grass-roots weapon as old as barn-raising and box suppers. Their secrets are three—and they will work just as well for you as for the North Carolinians:

1. *The organized community,* mobilizing the collective energies of every man, woman and child to raise the neighborhood by its bootstraps. This is usually accomplished by forming a community club, which crosses all other organization lines.

2. *Competition* between communities.

3. *Starting with simple, easy ideas.*

In an area handicapped by tiny farms and worn out soil, these three techniques have jumped the standard of living to an astonishing degree, and breathed a new spirit of self reliance and pride into thousands of families.

On one road 35 miles from Asheville, for example, you'll spot a typical sign, neatly lettered: "Welcome to IRON DUFF COMMUNITY, the Community with a Warm Heart." Here live 106 families.

"Seven years ago we had no telephones, no electric lights, and only three homes with bathrooms," recalls Frank Davis, one of the first community leaders. "Our farms were gullied, crops were poor and the cattle skinny. Our whole community was down-at-heel. We'd lost the art of working together.

"*Then we organized* and set

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ourselves some goals. Today every home has electricity, 70 have telephones, 83 have bathrooms. Both our churches have been remodeled. And our better farming pays for this better living."

This story has been duplicated in many other communities — Green Valley, Dunn's Rock, Cane Creek—where there was a recognition of the need and one or two "sparkplugs" to stimulate community action.

This revival of pioneer cooperation got its start seven years ago when a handful of business leaders in Asheville (pop. 55,000) took inventory of their regional resources. "We had some industry and tourist trade, but the area served is 70% rural—and poor."

Someone had heard that businessmen in Tupelo, Miss., after a similar soul-searching, had called in Doane Agricultural Service of St. Louis, one of the oldest farm management concerns in the United States, to advise them how to get the most out of what they had. So Lloyd Langdon, farm fieldman for Carolina Power & Light Co., and George Cecil, a dairyman, volunteered to visit Tupelo.

"Were our eyes opened!" exclaimed Lloyd. "Why one Tupelo bank alone had spent $6,000 that year to encourage agriculture. And you could see that it was paying dividends—in higher cotton yields, more milk per cow, better living standards."

The enthusiastic report which Langdon and Cecil brought back persuaded the Asheville Chamber of Commerce to hire Doane to make a survey in western North Carolina, of which Asheville is the natural trade center.

True Morse, then President of Doane's (now Undersecretary of Agriculture), and Morris McGough, who did the field work, presented their findings to a mass meeting of 900 farm, civic, industrial and business people.

The survey noted that a quarter of the milk used in the area was imported, as was $2 million worth of poultry products. Both, it was suggested, could be produced locally. Fertilizer and proper land use could improve the run-down, eroded soil. Trees, which covered nearly half of the land, could, if properly managed, yield an annual $15 to $20 per acre. And finally, since more people were living on land than it would support, the report suggested that new industry be encouraged to locate in the region.

Asheville leaders, reacting swiftly to this frank look at themselves, set up an Agricultural Development Council and hired McGough to run it. The Council urged communities to organize and compete against each other. As a kick-off, it offered $1,000 in prizes to the communities making

the most progress—to be judged 50% on community, 50% on farm and home improvement.

Only three communities entered the contest that first year, but their enthusiasm and progress proved contagious. For in 1951 there were 40.

This year more than 15,000 rural families in 105 communities are competing for $15,000 in prizes offered by Asheville business men, by smaller towns, by counties all over the area.

Enormous growth in the use of chemicals for agriculculture is shown by the increase in number of agricultural chemical products. There were about 50 in 1939, compared to more than 200 today.

Union, an open-country community of 57 families, used to be so out-of-the-way that only the tax collector knew it even existed. There was only one telephone in the township, no surfaced roads. "But we couldn't let little old Gilkey (a neighboring community which had won a prize) get ahead of us," said Jack Camp, president.

Now, four years later, Union has phones, roads, new homes, better farms. Their community has grown to 115 because "people asked us to move our road signs and let them in." They have just finished building their second community center. We outgrew our old one," Camp explained.

Then Roy Blankenship, a Cherokee farmer, got excited about what organization might do for his own drab neighborhood. The night he invited McGough to talk to the other Indians, only eight showed up, but these eight went ahead and elected officers. Soon the whole community was stirred up.

What they wanted most was electricity. So the Cherokees went to work and cut a right-of-way through the wooded mountains, 22 miles long and 40 feet wide. By the time the lines were energized, nearly every house in the Indian community was wired. Now the whole face of Big Cove Community has changed.

The purpose of the development program is better farming for better living, but the first project in most communities was to build and paint mailboxes. "Why?" we asked Brownlow Martin, president of Green Hill Community which has 134 families. "You have to do something quick to keep up interest," Martin said. "Mailboxes are easy to paint, can be done fast, and they get noticed."

"And you have no idea how dingy a white mailbox out front makes your house look—you have to paint the house too!" added another Green Hill member.

"Then you chase the chickens out of the yard and fix it up."

Church rebuilding and cemetery clean-up were high on most community lists of things that "needed doing." Most of the 250 churches have been remodeled or rebuilt by community work teams.

Rural ministers are quick to credit the community organizations with revived religious interest.

"When you make community progress, it's much easier to make church progress," says the Rev. Sam O'Neal, pastor of Pleasant Grove Baptist Church. "And I could name five families in a neighboring community who never went to church—before they helped build the new one as members of their community club. That made it *their* church."

More than 30 communities, outgrowing c r a m p e d meeting places in homes and churches, have built centers.

Here each community has its library, puts on plays, holds sings and invites city folk out for fried-chicken dinners. Boy Scout and 4-H groups use them for meetings and parties. "It's kept our young folks at home rather than burning gasoline all over the mountains," said one thankful parent.

Better farming practices, seldom mentioned in community goals the first year or two, come in the back door. "Human nature's a funny thing," explained Brownlow Martin. "We won't do a better job of farming just to earn more money. But we'll do it to improve our church, or because our community is trying to win a prize, or because our wives want new kitchens."

Julian Glazener, former Transylvania c o u n t y agricultural agent, says, "You can't force help on farmers or anyone else. They've got to want it. The organized community is the best tool I've seen in 22 years of Extension work to get new ideas adopted."

Farm accomplishments of the area during the past five years are impressive: Broiler income has jumped from $485,000 to $5,800,000. This increase developed along with a second source of income—hatching eggs, now an $8,500,000 farm business.

The new poultry i n d u s t r y brought more business for others: $2,700,000 for feed, $1,800,000 for buildings; $360,000 f o r equipment. A new hatchery has located in Asheville, and a New England firm is interested in putting up a broiler processing plant.

Dairy income has increased more than $2 million despite a decline in milk prices. Five years ago Asheville needed only one stockyard to handle cattle shipments. Today it has two stockyards and is building a third. In

the last four years beef cattle marketing has jumped from 43,000 to 100,000 head.

Income from selective cutting and thinning of timber has doubled. New crops have been introduced; pimento peppers, for example, are now a big cash crop in Rutherford County.

Green Hill farmers put up a packing shed where commercial vegetables can be assembled and partly processed to attract outside buyers. Dunn's Rock set up a roadside stand where women sold $1100 worth of extra garden produce, baked goods, flowers and jellies their first six Saturday mornings.

Who Wouldn't ?

Teacher (in rural school): "Now, Johnny, if your father was to sell 2000 bushels of wheat for $2 per bushel what would he get ?"

Johnny: "A Cadillac."

"That $1800 investment we paid for the Doane survey was like a golden goose—and she still is laying golden eggs," says George Cecil, president of the Agricultural Development Council.

But more important than the economics is what is happening to the people.

A true spirit of neighborliness has been rekindled. I heard stories by the dozen of how a community built a house for a burned-out family, another held community suppers to pay a burdensome hospital bill or tended crops for a man hurt in an accident.

In Cane Creek the Baptists pitched in to help build a Methodist parsonage, and the next year the Methodists turned out to help build a home for the Baptist minister. Both churches now share a power lawn mower.

The people, moreover, have accepted the responsibility for solving their own problems instead of sending an SOS to Washington. "Because of the interest and willingness to work, we've made tremendous progress on our own," says Bob Francis.

Among the unexpected benefits of community organization is better health. "Families who had lived on fat-back, home-made molasses and corn bread now eat a far wider variety of healthful foods" says Eugenia Ware, Rutherford County Home Demonstration Agent. "Women tell me they've cut their grocery bills in half by expanding their gardens and buying freezers."

Energies of youth have been harnessed for community service. The vice-president of most community clubs is a teen-ager. Meetings give youth a forum to express their views. In turn they work like beavers.

One of the most provocative

aspects of the entire community development program is that more than half the people who live on farms in western North Carolina have a job *off* the farm. Industrial leaders, many of them newly moved to the South, are enthusiastic about workers who are also part-time farmers.

"They're happier and more productive, have more pride, are more stable than city workers," says Charles Russell in charge of industrial relations at the Ecusta Paper Co., which employs 2,200 workers, 60% of whom own land.

D. Howard Doane, founder of Doane Agricultural Service, believes this pattern of progress can be repeated in almost any area because "there's more in the man than's in the land." Already communities in at least a dozen states are counting up the profits and benefits of community organization.

These Weather Records Are 4000 Years Old

Discovery of pine trees in the upper timberline of mountains in eastern California more than 4,000 years old is a reminder of the vast store of knowledge about the earth that remains to be unearthed.

By means of core borings, scientists have established the fabulous interval the trees have survived on the face of the earth, in spite of drought, flood and storm. Before this the giant sequoias at 3,500 years were thought to be the oldest trees, but the oldest pine now known had lived almost 1,000 years when the oldest sequoia was a seedling.

Furthermore, locked in the hearts of these strange mountain survivors is a 4,000 year old weather record, possibly of great significance, which the scientists are still unraveling. Indications are that the 1200's were very dry, the 1300's very wet, both to a degree not recorded in recent times, yet the studies already more than half suggest that it is the present climate of the region that is abnormal.

The truth of that suspicion will have to wait for proof on further studies, or perhaps only time can tell, but the ancient pines are a marvel in themselves which anyone who has ever looked at a tree with open eyes can appreciate. These incredibly tough and tenacious old specimens have clung to life under conditions that human beings could not tolerate. They were here long before our European forebears arrived and may well still be here when our children are gone. —*From the Philadelphia Inquirer*

New Styles in Corn Seedbeds

You may want to try one of these "minimum tillage" methods next spring . . .

Condensed from Crops & Soils

Sam R. Aldrich, Cornell University

SINCE 1950, several promising new methods for preparing corn seedbeds have been tried. They require much less work and seem to offer other advantages over conventional methods.

"Minimum tillage" — as the new methods are called — has five aims:

(1) To save labor by reducing number of trips over the field.

(2) To reduce soil packing from heavy wheel tractors.

(3) To increase the rate at which water enters the soil by leaving the surface loose and open.

(4) To reduce soil erosion by reducing water runoff and by leaving the soil in small aggregates or granules which are less easily carried off the field by water or wind.

(5) To reduce weeds: by leaving the soil surface too loose for annuals to germinate; by causing the broken rootstocks of perennials to lose contact with the soil and thus dry out and die.

Results of minimum tillage thus far suggest that, before taking your machinery to the field, you should ask yourself each time: "Is this trip necessary? Just what do I expect to accomplish?

Ohio researchers in 1938 planted corn on plowed ground with only a smoothing harrow or disc set straight to level the seedbed. Yields equalled those from the usual seedbed. After 14 years of trials, the Ohio people reported no advantage—and possibly some disadvantage — in working land more than is necessary for a good stand.

Their work paved the way for the newer methods now being

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tested on farms. They are (1) wheel-track planting, (2) planting on plowed ground with a level-packing tool attached behind the plow, (3) plow-planting, (4) mulch-tiller planting, and (5) ridge planting.

Before looking at each, let's consider the usual seedbed preparation for corn. In a typical schedule — plow, disc once or twice, harrow, and plant — the total trips over the field are at least four, and often more. Rotary hoeing (weeding), weed spraying, and several cultivations can raise the total to 10 or 11.

With a modern heavy tractor, each trip leaves tire tracks on strips of soil 3 feet wide. With the other machinery used in tillage, every four trips could lay a track on each square foot of soil.

What harm does this compaction do?

To date, no one has a full answer, but a close look within the soil raises further questions.

It is important to understand that the compacted zone is not immediately below the track. Why not? Because dry soil doesn't pack easily, and the top few inches always dry first after a rain. But the soil 4 to 8 or 12 inches down may still be wet enough to pack considerably. Cultivator shovels behind the wheel cannot reach this deeper, hidden zone of compaction.

There are exceptions to this pattern, of course. If the whole plow layer has a uniform moisture content, packing may start right at the surface. During a long drouth period, when the entire layer of topsoil is dry, there will be little or no compaction.

Now, let's study the five minimum tillage methods.

Wheel-track planting was started by R. L. Cook at Michigan State University in 1946. The field is usually plowed just ahead of planting so that the furrow slice doesn't have time to dry out and get hard, and rain can't intervene. A small tractor is needed if the wheels are to be set into the usual corn row width. Using a 2-row planter places the corn row directly in the tractor wheel tracks. The soil is firm around the seed. The corn germinates and comes up quickly.

The tractor wheel makes a good seedbed even in a cloddy field, provided that planting follows plowing before the clods dry out and get hard. The soil between the rows—except the front wheel tracks on tricycle tractors — is loose and open. Weed seeds in this soil germinate slowly in a normal season—sometimes not at all in dry seasons.

Many farmers like to plow early, work the soil down, and then harrow at 2-week intervals to kill weeds. "But why work a fine seed-bed to grow a crop of

weeds in the first place?" ask those who work with wheel-track planting.

This method works well on a wide range of soils—from sands to clay loams. Hundreds of Michigan farmers, and many more throughout the Corn Belt, now plant in wheel tracks. A check in Illinois in 1956 indicated that at least 1 or 2 farmers in many counties were using this method.

Consumers tend more and more to demand lean meat. From a feed economy standpoint, that's probably all right with the farmer who supplies the hogs and cattle. Livestock specialists have found that it takes 1,000 pounds of corn or feed equivalent to build a calf from 400 to 600 pounds. But for the growth from 900 to 1,100 pounds, it takes the equivalent of 2,150 pounds of feed. The larger or fatter the animal, the slower rate of gain.

Some farmers, like Orson Hill, Creston, Ill., have their own modifications. He was perhaps the first to add two extra rear tractor wheels spaced for use with a 4-row planter. In 1956 he planted 400 acres of corn and his neighbor planted 200 acres of soybeans, using this equipment.

Planting 2 rows at a time will handle up to 60 to 80 acres of corn per farm, but it is too slow for larger acreages. Another problem with large acreages is the delay in plowing. It is fine on sod in a wet year, but seriously dries the soil to the rooting depth of the sod in a dry spring.

Plow-planting combines plowing and planting into a single operation. R. B. Musgrave of Cornell University developed the method as follows: First, in 1951, he attached a standard 2-row planter to a plow. In 1954, he mounted the planter unit on the plow frame. In 1956, he attached the planter unit to the cultivator mounting on the tractor, and hung a fertilizer tank on the other side for balance.

A 3-bottom, 14-inch plow can plant one row at a time with 40 to 42 inches between the rows. A 5- or 6-bottom plow is needed for two rows. The planter unit raises and lowers with the plow. A depth gauge straddles the planter shoe to level and firm the row area and control the planting depth. The corn row can be placed on the center of the furrow slice, because the planter unit is mounted on the plow frame. The row width is determined by the width of the plow. It can be varied as much as 3 inches (by adjusting the front bottom to cut 2 inches nar-

rower or 1 inch wider than usual).

Plow-Planting Advantages

Plow-planting has several advantages: It is truly a once-over operation. It leaves no tracks for water to channel and run downhill. The row is centered on the furrow slice in contrast to being placed at random on and between slices when planting is a separate operation. The area between rows is not packed. Neither annual nor perennial weeds grow as well as in a firmed seedbed. Water infiltration is at a maximum.

Once over with the rotary hoe or cultipacker with weeder attached when corn is 8 to 10 inches tall, plus one cultivation, is usually enough. A weed spray can be applied if needed. Thus, the tractor makes only 3 or 4 trips over the field between plowing and harvest.

Plow-plant has some disadvantages. It is only a 1-row operation with a 3-bottom plow, and only a 2-row operation with a 5- or 6-bottom plow. Also, plowing is delayed until planting season, and sod ground may get too dry.

Row Spacing No Problem

Most farmers would hate to cultivate corn that is planted only 1 row at a time. But in practice, row spacing has been no problem. since the greatest variation between two rows is rarely more than 2 inches. Some Illinois farmers who tried plow-planting in 1956 used 4-row cultivators without changing the shovel spacing from one end of the field to the other.

A 3-bottom plow setup will plow-plant 10 to 12 acres per day. In a wet spring, when plowing is delayed anyway, two tractors can plant faster (20 to 24 acres a day) with both plow-planting than if one is plowing, discing and smoothing, and the other planting.

To compare sizes and prices of eggs, remember the minimum weight for large eggs is 24 ounces per dozen, for medium eggs 21 ounces a dozen, and for small eggs 18 ounces a dozen.

It works only in soils in good tilth. Otherwise there is not enough loose soil to make a good seedbed for the row of corn. The immediate results of plow-planting may not look as attractive as a carefully worked-down seedbed. But the rough surface has its advantages, too, especially on rolling land.

One way to adapt minimum tillage to 4-row operation is to pull a spike-tooth, rotary hoe (backwards), Valley tiller (formerly *Ezee Tiller),* Snowco spiral roller, sheepsfoot packer, or similar tool, behind the plow to level

and firm the soil. You can then plant with a 4-row planter. Michigan agronomists have studied this method since 1946. It works well in a soil with good tilth and good moisture content.

You will need experience to know when you are getting enough firming. You can get it with extra carrier wheels mounted on the planter frame in front of the planter shoes. Depth gauges on the shoes can be of help also. A pneumatic tire in place of the steel rim press wheel does the job on some soils.

This plan has wider practical possibilities at the present time than any other minimum tillage method for Corn Belt farms. The right packer tool and some additional working in the row—perhaps with rotary hoe sections or special packer wheels for the row-area—will adapt it to a wide range of soil conditions.

The Till Planter

The International Harvester *Till Planter* prepares a seedbed and plants two rows in one trip. The corn row is prepared with a narrow deep-running sweep, a wider sweep that runs shallower, and rotary sections. The strip between rows is left unstirred. In sod, this strip can be cultivated out later. Till planting on the contour is an excellent soil conservation measure.

In experiments with sod between rows, till planting gave reduced corn yields. The greatest reduction, of course, was in dry years. Extra fertilizer must be applied to make up for the nutrients not released from the unplowed sod strip between the rows. This doesn't apply when till-planted corn follows corn or soybeans.

Disadvantages of till planting: (1) it is only a 2-row operation; (2) the entire operation is delayed until corn planting time; (3) the plant growth between rows competes for moisture in dry seasons; (4) extra fertilizer is needed following sod; (5) a special machine and considerable power are required.

At Iowa State College, engineers turned a 14-inch furrow slice on top of a 28-inch unplowed strip on the contour. The corn row is centered on the ridge top, using a single-disc furrow opener in place of the planter's runner shoe. Adjustments must be made in equipment that is used for plowing, planting, cultivating and picking. Yields have been about equal to conventional methods. Corn rows can be grown for two years on the same ridges. It's advantages: less trips over the field; less water runoff and erosion; less drowning of corn in flat or depressed areas.

Seedbed and Rootbed

So far, we have looked at these methods from the standpoint of the seedbed. The *root-*

bed needs attention too.

In five locations in New York and Illinois, where plow-plant corn emerged equal to that on a conventional seedbed, the corn grew to about 8 inches and then seemed to stand still for 2 weeks. It eventually caught up, but the slowdown is undesirable. No satisfactory explanation was found, for the soil moisture was about the same down to the 16-inch depth.

Here is a tentative explanation. The secondary roots on corn develop nearer the surface than the first roots. When corn is 8 to 10 inches tall, the secondary roots extend out from the narrow row area in which a partial seedbed was prepared. Possibly, they do not get enough water or nutrients in a coarse rootbed because they just don't contact enough soil.

If this explanation is correct, the first cultivation or weeding in a dry year should be made as soon as the corn is large enough so that is won't be covered. In a wet year you could delay the first trip over the field after the corn is up until weeds need to be killed.

Tillage methods that leave the soil between the rows loose and open appear to be best adapted to areas that have ample soil moisture for a month before and after planting.

Combining minimum tillage and chemical weed control raises the old question of whether cultivation has benefits beyond weed control. Recent research suggests that, in most cases, there is some extra advantage in loosening the surface inch of soil. But there is no proof yet that cultivating benefits a soil in good tilth where the surface is already open and porous.

Cultivating to firm the rootbed following plow-plant or wheel-track planting serves a useful purpose, however.

For the efficient landowner and farmer, farming and farm returns can be expected to be in line with other sound investment over a period of years.

—Do-Well Timely Hints

Substitutes for Plowing

It is hard to beat the moldboard plow in humid regions. It works well on both sands and clays, and with every cover from tough sod to cornstalks. No tool is more efficient in the use of power. No tool results in fewer weeds.

A few farmers in central Illinois are using the Graham "plow," a chisel-type implement, on soybean stubble on silty-clay loams. The soil dries in the surface a few inches, but is sticky

deeper in the plow layer. The Graham does not turn up this plastic layer, which often dries hard and cloddy. A disc or field cultivator might be as good since the Graham blades may cut little more than a slit through the tight, sticky subsoil.

Rotary-type tillers now in use break down the plow layer, leaving the surface vulnerable to crusting after hard rain. The finely pulverized surface also speeds weed seed germination.

In the trend toward plowing 9 to 10 inches deep, minimum tillage methods should perform the same as conventional methods.

Most Corn Belt farmers like fall plowing and early spring plowing where the erosion hazard isn't serious. They need a minimum tillage method suited to 4-row planting and cultivating.

Fall-plowed ground and early spring-plowed ground are usually firm by corn planting time. A leveling-packing tool behind the plow would help to firm spring-plowed fields. Farmers now work the firm soil to kill weeds and smooth the seedbed. Possibly they could eliminate these trips with a 4-row planter. A wheel in front of each planter shoe would give the necessary firming and smoothing. Cultivator sweeps on the front of the tool bar would kill weeds, large and small. Spray equipment could be mounted for pre-emergence weed control.

Equipment Is Adaptable

No corn planter like this is available yet, but interested farmers could probably adapt their present equipment to this planting method.

No one claims that minimum tillage methods will produce more corn than conventional methods, although they may in some years on sloping fields where much of the rainfall often runs off. If they yield as well, their other advantages should recommend their adoption.

Results thus far indicate that seedbed styles for corn may be in for a change.

Inspect Grain Bins Regularly

What is the condition of your stored grains? David O. Quinn, entomologist at West Virginia University, says wheat storage bins should be checked at least once a month.

Quinn listed this general rule of the thumb to follow: Take 1-quart samples at random from the bins and examine the sample carefully for the presence of insects. If one or more rice weevils are found, or if a total of five other insects is found, the wheat probably should be fumigated. —*West Virginia University*

Law on the Farm

By Norm Krausz

First of a series on farm law by Norm Krauz of the University of Illinois Extension Service. Articles are prepared with Illinois conditions in mind. Laws in your state may differ.

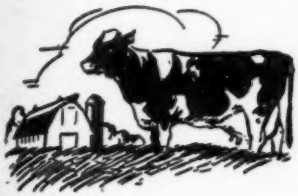
FARMERS are using a large amount of short-term credit to finance crops and to buy equipment, supplies, lambs and feeder cattle. The chattel mortgage is the most common form of security for such loans. It is simply an instrument allowing an owner of personal property to transfer title to another in return for a loan, and at the same time retain and use the property. The items of farm property generally included are feed, growing crops and livestock. However, machinery, equipment and other belongings may be included.

The mortgage must describe the items of property sufficiently to identify them. For example, to make the mortgage effective, livestock must be described by name, number or kind and markings. Crops, even unplanted crops, may be included if adequately identified and located. To include an unplanted crop, it must mature within 12 months from the date of the mortgage.

Here are some legal rules to remember when using chattel mortgages:

1. The mortgage must be acknowledged (notarized) and filed or recorded at the court house within 20 days after it is signed.
2. A chattel mortgage is valid for five years and three months, but it may be renewed by an affidavit. A change in the Illinois law in 1955 makes it possible to extend a chattel mortgage to 20 years and three months if the debt does not mature for that length of time.
3. It is illegal to sell or dispose of mortgaged property without the written consent of the person holding the mortgage. Anyone doing so is subject to a maximum fine of twice the value of the property sold and to a jail sentence not exceeding one year, or both.
4. When a chattel morgage has been paid, the borrower should make certain that a release has been entered with the county recorder.

Why Some Dairymen Make Money, Others Lose It



Here are the 4 major weaknesses of dairying today, and what you can do about them . . .

Condensed from Successful Farming

William Ward and *Dr. C. M. Chance,*
Cornell University

HERE'S a rather startling fact: A year's labor income for dairy farmers in the same county in New York ranged from a *minus* $5,500 to a *plus* $9,100 —a difference of $14,600! Why did some farmers lose so much money while others made a good profit? These answers may help you.

First of all, look at four major weaknesses of the farms that either "went in the hole" or had low incomes: (1) too few crop acres; (2) too few cows; (3) milk sold per man too low; (4) milk production per cow too low.

Too Few Crop Acres

One study made in Oneida County, New York, by Ralph Hadlock, associate county agricultural agent, and Harry Whitney of Cornell's Department of Agricultural Economics, showed that farmers with less than 50 acres of crop land made the least money, those with 150 to 200 the most. Their labor incomes climbed steadily as the number of crop acres increased.

Economists define your labor income as the amount left after you pay all farm expenses and deduct a charge for unpaid family labor and for interest on your invested capital. In addition to this income, you and your family have the use of a house and the foods produced on your farm.

Very large farms are not needed for reasonable farm incomes, but the trend is toward larger family farms—those that make up an efficient two-man business. The average-size farm in the United States is about 242 acres —100 acres larger than in 1910. In recent years average acreage per farm has climbed in every state. Larger farms make it possible to use equipment and other items more efficiently.

Too Few Cows

No longer will 10 or 15 cows

Reprinted by permission from Successful Farming, Des Moines, Iowa

provide a satisfactory living for a farm family. It takes three or four times that many. Dairy farms in Oneida County with 40 to 50 cows had the highest labor income. Those with less than 10 cows went in the hole $100 a year; with 15 cows they made a labor income of only $1,000 a year; with 33 cows it jumped to $2,040; 44 cows moved it up to $4,610. With 60 cows, however, the labor income dropped down to $3,367. The reason that income declined here was probably due to the fact that these farmers were not able to use their larger labor force most efficiently.

Work Units and Milk Sold Per Man Too Low

Work units measure labor efficiency on the farm. One work unit equals the average amount of productive work accomplished by one man in a 10-hour day. In the Oneida County survey, farms with 165 work units had only a $527 yearly labor income, 469 work units $1,653, and those with 838 work units $4,780.

While the work unit measurement of labor efficiency has value, it doesn't take into account the products produced or the output. On a dairy farm, milk sold per man is perhaps a better and simpler gauge. As the amount of milk sold per man in Oneida County went up, the annual labor income jumped.

One-third of the 155 dairy farms in the Oneida County survey had an annual labor income of $738 or less, based on the pounds of milk sold per man.

Milk Production Per Cow Too Low

Almost half of the Oneida County farms in the survey had cows producing less than the state average—7,000 pounds of milk.

Take a closer look at this big problem of low milk production per cow. Does cow size make a difference? Yes, as a general rule. A survey of 2,450 D.H.I.A. Holstein herds throughout New York State shows that provided the inheritance is there, a good big cow is usually better than a good small cow. The biggest cows produced twice as much milk as the smallest. Cows with an average body size of 1,100 pounds produced 6,600 pounds of milk, and cows weighing 1,330 pounds averaged 15,140 pounds of milk.

In between these high and low figures, milk production increased like this with each increase in body size: 1,120-pound cows, 7,960 pounds of milk; 1,170-pound cows, 9,290 pounds of milk; 1,210-pound cows, 10,500 pounds of milk—the average size and production of all the herds; 1,240-pound cows, 11,660 pounds of milk; 1,270-pound cows, 12,850 pounds of milk; and

1,300-pound cows, 13,960 pounds of milk.

Keep in mind that these are averages for cows within herd groups, and there were individual cows that had higher or lower records within these groups. Factors other than size, of course, such as herd management and environment, had an effect on production.

Farmers with big cows sold more milk and had a larger income over feed costs than those with small cows, even though the big cows consumed more feed.

Knows His Tomatoes

We teasingly asked our 90-year-old grandpa why he didn't get married again. His reply was prompt and philosophical: "Well I'll tell you," he said, "there ain't but one kind of a woman who'd have an old codger like me, and I'll be darned if I'm going to settle down and live with a fool." —Faye Anderson.

Moreover, farmers with big cows and the same size herd had another advantage — less labor. It takes about the same amount of time to care for a small cow and milk her as it does a large one—and you have less milk in the pail when you finish. For example, a farmer in this study with an average per-cow size of 1,100 pounds had to feed and milk twice as many cows as the farmer with 1,300-pound cows to get about the same total milk production.

Successful dairy farmers have also found that it pays to feed their cows enough high-quality, early cut roughage and grain to meet requirements for maximum production. In the New York study, all but 90 herds out of 2,450 were fed some silage and the rate of silage feeding was most closely associated with increased production, percentage of TDN fed, and income over feed costs.

Farmers who heavily fed good corn and grass silage, along with high-quality hay, were able to cut down a little on grain feeding and still get high milk production and the best labor incomes. Cows will eat about 3 pounds of silage and 1 pound of hay per 100 pounds of body weight, in addition to the grain mixture. They'll eat substantially more exceptionally good-quality hay and silage with less grain needed. The annual feed averages per cow for all herds totaled 7,600 pounds of silage, 4,300 pounds of hay, and 3,300 pounds of grain fed at a 1 to 4 ratio.

Dairymen often ask, "Where's the break-even point with grain feeding?"

The survey showed that the dairy farmers as a group who were

feeding more than 4,200 pounds of grain per cow were losing money. Income over feed cost increased at a declining rate for each additional 500 pounds of grain up to the 4,200 pounds. At that point the income over feed costs began to decline. This relationship did not change over a 2-year period, although the price of milk varied from $4.50 to $4 per hundred and grain from $75 to $65 a ton.

Success of a dairy farm business depends not on any *one* of the four points presented in this article but on all of them and on many other sound farm management practices. Dairymen who keep pace with advancement in over-all farm efficiency will gain the highest returns.

Poultry In The Future

Extension workers attending the Poultry Science Association meeting gave predictions of things to come in the poultry industry.

That egg that Mrs. Housewife cracked on the side of the skillet for breakfast this morning may be on the way out. In the not too far distant future she may be buying her eggs in compartmented plastic packages which enable her to see before she buys, the color and quality of every egg. Then too, she may be buying the eggs from a vending machine conveniently located to take care of purchases for that midnight snack after the stores have closed.

Charles W. Wampler of Harrisonburg, Virginia, thinks the outlook for poultry producers is very bright. As our population becomes even more a population of indoor people, the consumption of heavy meats will be replaced with the lighter foods such as poultry, milk and eggs.

W. E. Newlon from the University of California predicted that the egg candling machines are on the way out. Since the method now in use can only determine whether an egg is fit to eat and not its real quality, electronic machines will be developed to inspect the eggs for uniformity of shell color, weight, and density of yolk. Newlon believes that the air-conditioned, light-controlled hen house is just around the corner as poultrymen make a real effort to control temperature and light conditions which have such great effect on egg production. —*North Carolina Extension*

Selecting Breeding Swine

When there are differences we can select. If we choose the best, we can improve . .

Condensed from
American Hampshire Herdsman

Stewart H. Fowler, Washington State University

THE SWINE BREEDER has two basic tools to use in accomplishing improvement in the overall merit of his herd. They are (1) selection and (2) systems of mating.

Selection consists of choosing the parents of the next generation.

In the past, swine have been selected on the basis of fancy pedigrees, show-ring winnings, type fads, and the like. However, the progressive swine breeder of today, and the successful swine producer of tomorrow, know that practical and profitable selection must be based upon the ability of an animal to perform. This opinion is reflected in a wider acceptance and use of P.R. (Production Registry), and the relatively new Certified Meat Type Program.

Swine breeders are aided in their selection program by two very important factors. First, there is a wide variability in the genetical make-up of our swine breeds. This is evident from the fact that swine producers in this country have been able to change swine form considerably since the late 1800's, ranging from a cuffy, cob-roller type, through a big, rangy, cat-hammed type, to the present intermediate meat type. There is enough variation in the genes present in our swine breeds to mold swine type in almost any direction the breeder decides to go.

Secondly, it is necessary to use only a very small percentage of our pig population to reproduce the species. In fact, only 1 to 2 per cent of the boars and 10 to 15 per cent of the sows are needed for replacements if the hog population is not increasing. Of course, this means that the progressive breeder can be very critical in his selection of breeding stock—with such a small number of replacements needed, he can save nothing but the very best, and that is the only way that progress and improvement can be accomplished.

The effectiveness of selecting

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the parents for the improvement of future generations of pigs depends upon three major considerations. They are: (1) A clear perception of what constitutes usefulness in a pig, with regard to the production of a quality meat-type carcass and the ability to produce abundant progeny of the required kind; (2) a knowledge of the means of measuring and valuing the usefulness of a pig; and (3) a knowledge of the means of measuring and valuing the ability of a pig to produce progeny of the required kind.

A wise dairyman feeds his cows according to their milk production.

The usefulness and value of a pig is determined largely by two factors. They are: (1) the quantity and quality of the meat produced, and (2) the cost of the feed, labor, and other items used to produce that meat.

It is desirable to develop "yardsticks" to apply to the various phases of swine production in order to give some indication of the productive value of particular individuals. Such yardsticks may be applied to: (1) fecundity, (2) milking capacity of the sows, (3) growth rate of the pigs, (4) efficiency of feed utilization, and (5) quantity and quality of carcass. This means, of course, that careful records must be maintained on the herd.

Fecundity may be measured by keeping individual sow records, which indicate the regularity of breeding and the number of pigs farrowed in each litter. The milking capacity of the sows may be measured rather accurately by securing weaning weights for all litters. Growth rate of the pigs may be secured by weighing the pigs at weaning and again at another set age (5 months of age, for example) and calculating the average daily gain.

The efficiency of feed utilization may be measured by feeding litters separately and recording all the feed that is consumed during the feeding period. By weighing the litter at the beginning and the end of the feeding period, the pounds of feed required per 100 pounds of gain may be computed. The quantity and quality of carcass may be secured through obtaining slaughter data on a few test animals. Most packers and other meat processors are willing to cooperate with swine producers for this purpose. The desirable measurements to obtain on each carcass are: (1) the average backfat thickness, (2) the carcass length from first rib to the aitch bone, and (3) the area of lean meat in the loin. The percentage yield in the primal cuts is also desir-

able, but it is a bit more difficult to obtain as some of the carcasses will be sold without breaking them into primal cuts.

Selection may be based on three major considerations. They are: (1) the individuality of the animal, (2) the animal's pedigree, and (3) the animal's performance. Of the three, the third is by far the best and most effective.

Individuality tells the breeder what the animal *appears* to be, the pedigree tells what the animal *should* be, and performance tells what the animal *actually* is. Or, to put it another way, individuality tells of the present, pedigree tells of the past, and performance predicts the future. If performance records are not available, then a careful consideration should be given to both individuality and pedigree in selecting breeding animals. Well-kept performance records, however, remove most of the guesswork in a sound selection program.

Pole-Type Farm Building Plans

Many sizes and shapes of farm buildings can now be constructed from a few standard parts used in various combinations as a result of two years' research at Oregon State College.

Basic details and 18 possible building combinations are included among pictorial drawings in an Oregon bulletin prepared by L. W. Bonnicksen, agricultural engineer. Free copies of the bulletin, "Multi Combination Pole-Type Construction," are available from Oregon State College, Bulletin Clerk, Corvallis, Oregon.

Other main features of this type of construction include "installment building" with easy expansion in certain buildings' width and shape and use of rigid-pillar or pole construction that requires little or no bracing and no walls for roof support. A wall can be placed or removed at any time without disturbing the rest of the structure. Also, no expensive foundation walls are required.

This pole-type construction permits use of low-grade lumber, and many types of roofing and wall materials, Bonnicksen reports. Although easy and economical to assemble, a combination of strong joints and anchored building frame provides a rigid, durable structure.

Such buildings can be erected without expensive scaffolding, says Bonnicksen, requiring only ladders and portable platforms. The 24-page bulletin includes drawings and photos in sufficient detail to enable a farmer to develop plans for many combinations of suitable farm buildings. —*Oregon State College*

"Squab Broilers" Are Catching On

Excellent profits are being made in the production of 1½-pound broilers for high class trade . . .

Condensed from New Jersey Farm and Garden

CHICKENS no sooner get on the farm than they're taken off to satisfy demands of a new business being promoted by some Northeastern broilermen. They're marketing 1½-pound, six-week-old Cornish Crosses as "squab broilers." For dinner they're served one to a person.

Here's how one grower, in New York State, has set up his "squab" operation: He puts in 20,000 chicks at a time. Dressing starts when birds are six weeks old and is completed in eight weeks. Using a garden tractor he plows up the litter and starts all over at 10 weeks—allowing two weeks for cleaning up. He's rid of the birds before they can get too much disease.

Coccidiosis, however, at an early age, can seriously affect weight and appearance. Or birds are kept until they recover, then are sold as broilers.

One Chick Per Person

Hatcherymen point out another advantage: Every time a squab is sold it means one chick consumed per person, compared to perhaps three persons per chick for a broiler, or more for roasters.

Most "squab" growers have been aiming specifically for restaurant trade since it means quantity business and to date response has been enthusiastic. Delmonico's, famous New York restaurant, in the Gay Nineties, first introduced this one-to-a-person serving, but their birds didn't have the "new look."

Other growers are selling squab broilers to the freezer-locker trade. Some are retailing their own and one grower is even mailing dressed birds to points where overnight arrival is possible. One Atlantic County grower sells the birds stuffed with special rice dressing for "carriage trade" eating places.

The Cornish Cross seems especially suited for squab since it has a plump body conformation at an early age. Thighs are well-meated, and there's plenty of white meat packed across the breast.

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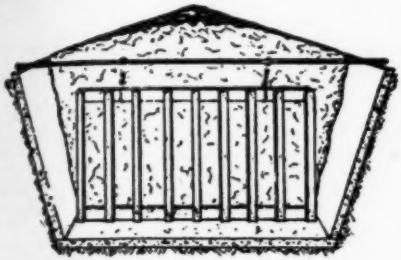
Self-Feeding Bunker Silo and Pole-Type Shed



These innovations may help reduce labor costs for the hard-pressed dairy farmer . . .

Condensed from
New England Homestead

Dr. J. W. Cobble,
University of Rhode Island

EFFICIENCY of dairy cattle management is a big problem of dairy farmers throughout the country. Two main difficulties are securing adequate barn space for maintenance of heifers grown for replacement and the reduction of farm labor costs.

In some areas the combination use of the self-feeding bunker silo and the pole-barn loafing shed has helped to solve these problems. In many cases the entire herd, including the milking cows, has been placed under this system of management.

Since the University of Rhode Island dairy needed more silo and barn space, it was decided to try a self-feeding bunker silo and loafing shed combination for bred heifers. An experimental plan was devised to check the relative value of this system of management compared to the usual stanchioning of heifers in the barn.

Bunker Silo Constructed

During the spring of 1955, a bunker silo was constructed, 18 feet wide, 50 feet long, and 7 feet high with an approximate capacity of 125 tons of silage. Due to lack of available forage at the time of filling, only 80 tons of green feed were put in the silo. The exposed surface was covered with 6 inches of sawdust and shavings and then approximately 6 inches of straw. Potassium metabisulfite was used as a preservative in the amount of 4 pounds per ton of green forage.

Erect Pole-Type Shed

Later in the fall a pole-type shed was built to house the heifers in the self-feeding experiment. This building was 19 feet wide and 48 feet long giving 912 square feet of shed area, with one long side open to the south. This area, when not being used as shelter for the heifers, supplies

Reprinted by permission from New England Homestead, Springfield, Mass.

a possible area for storage of machinery, hay, or bedding.

In this preliminary work the following information has been noted in respect to this study:

1. The building materials purchased for the construction of the bunker silo amounted to $790 and for the pole-shed $594—or a total of $1384. Two hundred and twenty man-hours of labor were required to complete the two structures, about 120 for the barn and 100 for the silo.

2. Twenty-one heifers ages 12 to 18 months were maintained under this system for 67 days, from November 15 to January 20. Their only feed during this period was the grass-legume silage stored in the bunker silo. Weight records show that all animals gained an average of slightly more than one pound per day for the first 30 days. During the last 37 days the average gain was only one half pound per day per animal. This lower rate was due to the fact that the younger animals failed to gain during the latter period.

3. Thirty man-hours of labor were required to care for the 21 heifers during a 10-week period. The labor was used in removing refused silage and manure from the silo area and moving the self-feeding gate forward as the animals consumed the silage. This can be compared to 120 man-hours required to remove manure, feed, and bed-down a similar group of heifers stanchioned in a conventional manner in the dairy barn.

4. No difficulties were experienced in self-feeding heifers, either during rainy weather or when temperatures dropped as low as 6 to 8°F below zero. All animals remained in excellent health during the trial period.

From our experience in this preliminary trial we think that bred heifers in average condition in the fall can be wintered successfully by the use of the loafing type shed and good grass-legume silage from a self-feeding bunker silo. The labor costs as well as feeding costs are substantially lower when compared to animals housed in a stanchion barn. If the silage contains little or no legumes, a protein supplement and grain will probably be needed to maintain desired condition. The supplement can be added to the silage as a preservative, thereby balancing the ration with little extra labor cost.

Should animals of 6 to 12 months be maintained under this system of management, grain in the silage or grain feed supplied separately will certainly be required to maintain n o r m a l growth. At this age it probably would be advisable to make available a self-feeding hay rack so a limited amount of hay can supplement the silage.

How Much Beef Weight is Enough?

Ideal size is the largest size which will retain the required degree of finish at the desired market weight . . .

Condensed from The Shorthorn World

Dr. J. H. Knox, New Mexico A. & M. College

WE COULD not do better than to start this discussion by quoting from the late Professor Guilbert of California. He stated, "Ideal size can be defined as the largest size which will attain the required degree of fatness at the desired market weight." Why did Professor Guilbert recommend cattle of large size? When does size become too great for market demands?

In the former case we may consider the advantages of large cattle from the standpoint of the feeder, and the breeder and producer. The feeders' case is more simple and may be discussed first. It is well established that young cattle produce gains from less feed than older cattle. This being the case it follows that cattle of the large type will produce beef at a given weight with a lower outlay for feed than small type cattle. In spite of claims made by advocates from both sides, this is the only advantage for large cattle, however. When we breed cattle with large size we are in a position to take advantage of the efficiency of youth by bringing them to the desired market more quickly.

The advantages to the producer are more numerous and more important. Feed is not the only cost in producing cattle. This is especially true for western cattlemen where feed costs may be low but other costs high. Many of these other costs are fixed overhead which are the same for all cattle regardless of size. It may be argued that 120 small cows will require no more feed that 100 large cows. This same argument can not be used for the factors being discussed here. They include some major and some minor items such as; taxes, veterinary and vaccine costs, bull service, some labor items and grazing fees in public land states where such charges are assessed by the head without regard to size. The cost will be the same for each small cow as for each large cow and therefore will

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be more for each pound of beef produced when small cows are used.

Fifty Per Cent More Calf Weight

The results of recent investigations have shown that the advantages to the breeder from selecting large cattle are much greater than this. Selecting breeding stock for weight-for-age at the New Mexico experiment station has resulted in cows which not only produced heavier calves but raised more of them. The cows bred more regularly and stayed in the herd longer than cows selected for type and quality without reference to size. The final result has been about 50 per cent more calf weight produced in the lifetime of the big cows.

The facts are that selection for weight in young cattle involves a whole group of desirable factors. When you select big, heavy, bloomy heifer calves you not only pick the big ones, but at the same time you select those from good milking cows and cows that are early breeders. When you choose heavy yearlings or two year olds, you pick the good doing heifers which are well suited to your conditions. This last point may be very important in the range country, or in the south where temperatures are high and parasites numerous. At any rate these factors have proved important in the experiment referred to above where the big cows were more capable of withstanding severe drouth conditions. When weight is not given consideration in choosing young animals for the breeding herd, there is very little selecting for these important traits. When preference is given to small animals as may have been done in some cases a few years ago, there actually may be some selection away from good milk production and hardiness as well as from size itself.

Now the question will be asked if there is any negative selection in breeding for greater size?

Insurance companies estimate 25 per cent of fires of undetermined origin in the United States are caused by rats. They cause short circuits, ignite matches, and upset lamps.

Some have pictured big cattle as being shallow bodied and lacking in thickness. Surely this is not the case for these are the very traits that give them superior weight. Big cattle are frequently referred to as rough. Most people will agree that rough shoulders and tail settings are found as frequently among cattle of smaller type. It seems probable, although it has not yet been proved, that large cattle may have a little greater tendency to roughness over the back and openness in front of hips. We are

not saying that all out selection for size will not alter the type and appearance of the cattle. Certainly bodies will become longer. Experience has shown us the extremely short legs and heads will also disappear, although they are not directly related to weight. These factors can be held in a weight selection program and this will probably be done by many breeders, but it will result in somewhat slower progress in breeding heavier cattle.

What About Early Maturity?

The next question raised may be early maturity. As far as the writer has been able to learn both from experience and study, there is no evidence that smaller, more compact type of cattle will fatten younger than growthy cattle. They do fatten at lighter weights, of course. This has given rise to the general impression that they possess early maturity. Recognition of this fact caused Professor Guilbert's warning that size of cattle must be limited to those that would fatten at popular weights.

Demand for lighter beef has been the trend in this country for the past fifty years. This started very early in the century with the loss of our export market, which was for heavy beef produced from three and four-year-old steers. The trend was continued by shifts in populations and, to some extent, by changes in the eating habits of our people. There have been tremendous increases in population in the South and West where lighter beef is preferred. The population in the northeastern states where heavy beef is used makes up a smaller percentage of the total than 40 years ago.

Much publicity has been given to this change and it is the principle justification for breeding smaller cattle. The idea is held by some that we want beef only from light young cattle. Actually the country demands beef of a large variety of weights and grades. Whenever any of these are oversupplied prices are depressed. We still have a market for 1,400-pound steers. Often prices are very attractive when they are present in numbers equal to or slightly below demand. These cattle are sometimes held in bad repute because the limited outlet may be easily over supplied with disastrous results. We are not particularly interested in this class of cattle. As breeders we should provide feeder cattle of size and quality, but their final production is determined by those who grow out and fatten them. All cattle can be fattened at lighter weights, and the idea that over-supplies of such cattle are due to breeding

plans is entirely erroneous.

A Look At The Statistics

Statistics may give us some information about the kind of cattle being marketed. In 1954, about one-third of the feeders shipped from eight major markets were steers weighing over 700 pounds, one-third from 500 to 700 pounds, and slightly more than one-third were calves, both steers and heifers. Of this latter group many are used for grazing before going into feed lots. The average weights, by grades of all beef steers sold on six midwestern markets in May, 1956, were 1,280 pounds for prime, 1,150 for choice, 1,100 for good grade. The weights for May, 1955, were about 30 pounds less in each grade. The differences between prices for steers weighing 1,100 pounds from those weighing less than this amount was not as great as some might expect.

In May, 1956, lighter prime steers outsold those in the heavier class by 10 cents a hundred pounds and lighter choice steers beat their heavier brothers by only 4 cents. In the same month of the preceding year, the heavier prime cattle had an advantage of 13 cents while the lighter choice steers sold 6 cents a hundred pounds above the heavier steers of this grade. This shows the market preference, if any, is in the nature of 50 cents per head. These figures are not used to claim that there may not be a strong discrimination against heavy cattle at times. The purpose is to show that it is by no means universal and when it exists it will usually effect cattle heavier than those we will discuss.

A little further study of market reports show that for May, 1956, the distribution of beef steers in the various grades on six markets were: 2 per cent prime, 60 per cent choice, 32 per cent good, and 6 per cent all other grades. For further discussion we will confine ourselves to the choice grade although good beef cattle should be capable of being fed to prime grade when the occasion demands.

The plans of beef production which will be considered here are: fattening farm-raised calves immediately after weaning; fattening range raised calves in the same manner and fattening yearling steers which have been run on the ranges or pastures a year before being put on feed.

It is necessary to consider this latter group for there are many grain fields and pastures which can be used most profitably by this class of cattle. The production of slaughter calves on one hand and fattening two year old steers on the other are omitted. They are of some importance, but I believe a good case could be made for big, heavy milking

cows for calf production. Fattening older cattle is more of a feeder's choice based on what he thinks the market will be than a necessary part of the nation's beef production.

Well-bred, farm-raised steer calves fed standard fattening rations will usually reach choice grade at about 14 months of age. Range calves fed in a similar manner should reach the same finish at 16 months. It is the usual practice to send the heavy and fatter range calves directly to the feed lot after weaning and carry the lighter ones over as yearlings. These yearlings will weigh around 700 pounds at 20 months of age, perhaps a little more in the northwest and a little less in the southwest. These should make choice beef by the time they are 24 to 26 months old depending on the kind of pasture they had the previous summer.

The price-depressing effect of surplus agricultural stockpiles cut net farm income last year at least 20 per cent, according to marketing specialists in the U. S. Department of Agriculture.

How Much Weight Is Too Much?

We find steers in the broadest demand are those grading choice with a market weight of 1,100 pounds which is about 50 pounds below their farm weight. At this point I would like to change the question, "How much weight is enough?" to "How much weight is too much?" for we have shown that it is most profitable to produce cattle as large as are acceptable to the market. It seems that our cattle should produce farm-raised steers which can be fattened to choice grade at 900 to 950 pounds when 14 months old; 950 to 1,000 pounds at 16 months if range raised, and 1,100 to 1,200 pounds at about 26 months of age after running on range or pasture as yearlings. The market weight in each case would be about 50 pounds less. Marketed at prime grade these cattle would be a little heavier and somewhat lighter if sold when they grade good. It is hard to interpret this into weight of breeding cattle for a 1,000-pound cow in southern New Mexico may be a 1,100-pound cow in northern New Mexico or a 1,300-pound cow in Montana. A 1,400-pound range bull may be a 1,700-pound farm bull or a ton herd bull. Clearly they are larger cattle than generally prevail at this time.

This still leaves a small percentage of heavier and lighter cattle unaccounted for. There can be little question that heavy beef will be made most economically from growthy cattle with quality. Many of the lighter car-

casses can be obtained from the heifer end of cattle such as we have described. They will finish about 100 pounds lighter than their brothers. There is another thing we want to remember, not every one is going to take our advice. Some because they can't; some because they don't want to. The statement that most of our cattle should be of such size that the steers can be finished to choice grade at market weights from 900 to 1,200 pounds seems reasonable. There will always be larger and smaller cattle than any recommended standard. Perhaps this is as it should be for no one kind of cattle can meet all our beef requirements.

I believe we have found Professor Guilbert's recommendation to be sound. Growthy steers will reach required weights more quickly and with the use of less feed. Breeding cattle selected for weight-for-age will be more profitable to the producer. There will be less fixed charges per pound of beef produced. The cows will produce more and heavier calves and will stay with you longer under hard conditions. There are two ways to produce lighter beef carcasses. One is to breed small cattle. The other is to market them young. We believe the latter method will supply the amount of beef needed by the increasing population, return greater profits to the producer, and provide consumers with tender beef without waste.

Spreading Alfalfas May Become High-Producing

Alfalfa growers may one day be able to plant high-producing strains of alfalfa that will spread, producing several new plants from each "mother" plant.

Researchers at Virginia Agricultural Experiment Station, along with those in several other states, are testing several varieties of "creeping" alfalfa, which they hope may help replenish stands which are thinned by adverse climatic, soil, and disease factors.

These spreading alfalfas are being evaluated for their reaction to diseases, productivity, survival when grown with grass, quality, hardiness, and adaptability — as well as effectiveness in spreading and persistence under grazing.

None of the present types of spreading alfalfa are productive enough for wide adoption, so scientists are crossing them with some of the outstanding hay alfalfas. The main objective is to add spreading ability to the best of the hay types that have good resistence to diseases and insects. —*Virginia Polytechnic Institute*

Flexible Plastic Pipe

It's easier to install, won't damage by freezing . . .

Condensed from American Agriculturist

Forrest B. Wright, Cornell University

WATER is the principal raw material from which farm products are made. For example, milk is 88% water, eggs are 66%, and many crops are better than 90% water. It pays big dividends to have a plentiful supply of this important commodity piped to the places where it is needed.

A relatively new product, flexible plastic tubing, has a number of advantages for piping water around a farmstead, particularly for out-of-door supply lines.

In the smaller sizes, plastic tubing is slightly cheaper than other piping materials. In larger sizes the cost is only slightly higher. The labor cost for installation is usually considerably less than for steel or copper pipe which, in many cases, makes for the lowest overall installed-ready-for-use cost.

The tubing is available in long lengths. This makes it possible to install long runs without making joints.

A jackknife and a screwdriver are the only tools needed for making connections. The pipe can be easily cut with a knife and attached to fittings by means of clamps which are tightened with a screwdriver. Threaded plastic fittings can be screwed together or into metal fittings by hand and made watertight without wrenches.

The tubing is light in weight compared to steel pipe. Therefore, it is easy to handle. One man can easily carry and unroll a 400 foot length.

For underground installation simply turn a furrow with a plow, unroll the tubing into the furrow and turn the earth back on the tubing. If a considerable amount of tubing is to be laid underground there is an attachment for a subsoiler which will

Available Lengths of Plastic Tubing

Size	Length	Weight per coil
½"	400' coils	41.2 lbs.
¾"	400' coils	56.0 lbs.
1"	300' coils	54.3 lbs.
1¼"	300' coils	80.1 lbs.
1½"	250' coils	80.0 lbs.
2"	200' coils	89.0 lbs.
2½"	200' coils	136. lbs.
3"	100' coils	91. lbs.
4"	25' str. lgths.	31.25 lbs.
6"	25' str. lgths.	55.75 lbs.

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automatically feed the tubing underground and leave it covered all in one operation.

As the tubing is elastic, especially when warm, it should not be pulled in place. Unroll and lay it in the trench. Allow about 1 foot of extra length per 100 feet to allow for contraction. This can be done by "snaking" the tubing in the trench.

Plastic tubing is noncorrosive, therefore, does not rust or accumulate scale as does steel pipe. Tests indicate exceptionally longer life in this respect.

The interior surface is smooth, and because it does not corrode or collect scale, it tends to remain that way. This in turn means that friction losses are held at a minimum.

The tubing is extremely stable chemically; therefore it imparts no odor or taste to the water.

Because the tubing is elastic it will not burst if the water in it freezes. However, if the water freezes the flow will be shut off until the ice has melted. For this reason, when installed for year around service, the tubing should be laid below the frost line or otherwise protected from frost.

Being flexible, turns can be made in the line without fittings, and long lengths will readily conform to the land contour. When used for portable waterers or for irrigation, both flexibility and its light weight make it easy to move from place to place.

By means of special adapters the plastic tubing can be attached to any existing piping system at standard fittings such as tees and elbows.

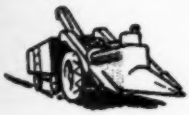
Because of its light weight and flexibility it is ideal for two pipe jet installations for wells to 100 feet in depth. In case the jet has to be pulled at any time, one or two men can do the job by hand, while with metal piping a derrick or crane is often needed. For well depths over 100 feet, metal pipe should be used because the long lengths of plastic tend to stretch when suspended at one end. This weakens the walls so that the high pressures required for the exceptionally deep well may burst the tubing.

Plastic tubing is sensitive to heat; therefore, it should *never* be used for a hot water line. In fact, it should not be used for any inside plumbing unless the local plumbing code permits it.

Wherever installed it should be protected from mechanical injury. It is very easily cut by any sharp object. When laying in a trench avoid covering with stones directly on the pipe.

It is practical to install electric cable or tape on plastic tubing to prevent freezing, but precautions should be taken to prevent overheating. Use a thermostat control and do not cover the cable and tubing with insulation.

Farm Machinery in 1976



A preview of the future — a look at farm machinery 20 years ahead . . .

Condensed from The Young Farmer

An Interview with *Mr. Martin Ronning,*

Chief Consulting Engineer for Minneapolis-Moline

MR. RONNING, you've been in this farm implement business for a long time. What would you say are the major changes that have taken place during the past twenty years?

Well, there have been a lot of rapid advances but I think they generally fall into two categories —first the shift to tractor power from animal power, and second, the development of implements specifically built around power units. For years, you know, we were making implements that were really just modifications of the old horse-drawn machines. Only in the last few years have we started to develop the pure forms of power farm implements. Now this development is proceeding rapidly and in a few years some of our old concepts of power farming are going to see major changes.

That's really our main reason for talking with you today. We want to explore that future you are talking about. Just what do you think is going to happen in the farm machinery field in the next 20 years?

Nobody can predict exactly what will happen in the future. But I think some trends are becoming evident that point the way to future developments. I don't think we are going to see anything as radical as the change from horses to engines, but we are certainly going to see rapid advances in improving the efficiency of our present machines. I don't think there's any doubt that the machines of the future, except perhaps for tractors, are going to be smaller and lighter. They will be much more efficient than today's machines.

You think, then, that we've seen our biggest machines?

Except for a few specialized examples, yes. Smaller, more efficient machines are more maneuverable, easier to maintain, and less expensive to operate. I want to emphasize this efficiency factor. I think you'll be amazed

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at the capacity that our forage harvester of the future will have, for example. Field speeds may well be doubled. I think it will have many more uses than it has now.

You say it will have more uses. Does that mean some of our present machines will be eliminated?

I'm sure they will. Already many implement companies are doing some pioneering work in multiple uses for harvesting equipment. I expect the same thing for field preparation machines. We will see fewer, more flexible machines.

Does this mean the farmer of the future will have to spend less for his machinery?

Not in total dollars. His machines are going to be more complex, yet more convenient, and built of materials that will last longer. All of these things will add to the cost. However, the machines will be able to do much more work. I think their increased capacity will definitely cut down the per acre cost of machinery.

You mentioned increased convenience. What, specifically, did you have in mind?

There will be several things. Sealed greased bearings, for example, so that the farmer will never have to use the grease gun; better riding qualities on all machinery; self-adjusting machines which ease the job of the operator; increased use of electric and hydraulic control systems; and, of course, we hope to keep finding ways of making machinery safer to operate. We should see real progress in the safety field because of the agreement between all implement companies to share safety devices and ideas.

Many of these conveniences could be put on our farm machines right now if the price situation would permit. At present, however, farmers prefer to take a more standard machine than to pay the premium necessary for the refinements. You must remember that the farm machinery business is very competitive with low profit margins. Each company strives to bring in improvements as fast as it can and still keep prices competitive.

Do you see any possibility of really radical machines springing up overnight?

There's no doubt that a few radical machines will be developed. These can be expected particularly in the realm of irrigation, deep tillage, and perhaps spray equipment. Generally, though, I think you will see a general evolution of machinery with advances coming as improvements upon existing machines instead of the development of brand new equipment. For example, we will all be watching the gas turbine engine,

and if it looks good as an agricultural power unit, it will be used. However, I don't think it would revolutionize our plans.

How about your Uni-Farmor? Isn't that a radical type of farm machine?

In a sense I suppose you could call it a radical idea. But it still evolved from a number of other farm implements. With the Uni-Farmor we have made one power unit that drives several machines. With this power unit we can operate a windrower, forage harvester, combine, corn husker, corn picker-sheller, and a baler. We will add even more units eventually. We expect other implement companies to adopt the same idea because it enables the farmer to own more machines at a lower per unit cost.

While discussing her wedding plans with a friend, the young lady said: "Bill is taking me to France on our honeymoon." "How nice," replied the friend, "how did you learn about it?" The engaged young lady smiled demurely. "He said that after we were married he would show me where he was wounded during the last war." —Better Crops.

Does this Uni-Farmor replace the need for the conventional tractor?

No. Its main use will be found in the diversified farming areas where farmers need a variety of implements. But the tractor will always have its place.

How about push-button machines? Will the day ever come when the farmer can sit in an air-conditioned control tower on his barn and control all his field machinery just by pushing the right button?

I don't think so. We are certainly going to see some field work done automatically, such as the devices now in use which guide a tractor by "feeling" the edge of the plow furrow. But the majority of field work and harvesting is going to have to be done under the supervision of an operator. It would be pretty hard to make a combine for example, which could automatically make the adjustments necessary when you're harvesting wheat of varied height. Farms vary so much, and so many situations arise in the field, that someone is going to have to be on the spot all the time to see that the machine is working correctly.

Where do you get your ideas for new machinery?

That's easy. We talk to farmers. We spend a lot of time out in the field, watching farmers use our machines and checking to see where they are having trouble or where there is a need for something better than we are presently

manufacturing. As soon as we see a need developing, we get to work on something to take care of it. Sometimes we work in advance of the farmers, too. For example, when we hear of a new practice that looks like it might be widely accepted, we study it closely to see what the machinery requirements will be. Then we are ready to go to market with the machine at the same time the farmer discovers he needs it.

Do you get many usable ideas from farmers? By that I mean ideas that fall in the inventions category.

We certainly do. Farmers are an ingenious lot. They are always working to see if they can't make our machines work a little better. And sometimes they succeed. We get a steady stream of letters with ideas. About one in a hundred of these will have an idea we haven't thought of. When this happens, we contact the farmer and if his idea is patentable, we help him take out a patent, then we buy the rights, and pay him royalties for the term of the patent.

There is no machinery that can provide a substitute for the good neighbor.

Sounds like an easy way to get rich.

Well, it's not that easy. Few of the ideas are good enough to pay really well. Most of them are concerned with specific problems that exist only in isolated localities.

If we had an idea, how would we go about selling it to you?

Just write us a letter explaining your idea carefully. You can also contact a dealer and if it's good enough, he'll let us know about it. For your own protection, you should make a careful drawing of your plan and have it notarized and witnessed before you disclose it to anyone. No implement company will try to steal your idea, but its always best to protect it before you try to sell it. If your idea has any merit, we will help you patent it. There is one more point I want to make, however. All implement manufacturers work several years on advance planning before they actually put a new model on the market. So there's always a good possibility that we have already thought of your innovation.

We know a lot of vo-ag students who like to tinker with machinery. How would they get a job with an implement company?

We would advise them to go to college and get a degree in Agricultural Engineering. And, as long as you asked me, I would like to put in a plug for this training. We all know that only about half of our nation's farm youth will have room to farm.

The other half will have to find jobs elsewhere. I hope some of these will want to be Agricultural Engineers. It is a wide-open field with opportunity everywhere. *At the present, there are literally no unemployed agricultural engineers.* Every graduate is snapped up, either by the farm machinery industry, the U.S.D.A., colleges, or the dozens of other firms that do business with agriculture. The graduate engineer can do research, drafting, design, sales, or management work. He can pick his own field and go as far as his skills allow. The salary is good, and the work is rewarding. And he'll still be working in agriculture, even if he's not farming. You can get information on Agricultural Engineering courses by contacting almost any state agricultural college.

Don't borrow trouble. Be patient and you'll soon have some of your own.

From our own personal observations, Agricultural Engineering has always looked like a very worthwhile field. Now, is there anything else you would like to say in summing up?

I think we've covered everything pretty well. I would like to leave one thought, however. As you know, the competition between the various companies manufacturing agricultural implements is very spirited. This competition stands to benefit farmers considerably. For each company is doing its best to give him a better machine at a better price. This, more than anything else, insures the farmer that his machinery will keep up with all the other technological changes in farming. The farmer of the future won't have to worry about the quality of his machines.

Report On Ketosis

The cause of Ketosis in dairy cattle may be a problem of metabolism, rather than nutrition, states the University of Maryland. Ketosis is found in herds fed rations adequate in every respect to present-day knowledge. Many cows develop ketosis for three to six consecutive years regardless of changes in diet and environment. Usually occurring within three weeks after calving, cows lose weight and appetite fast, often become nervous, and milk production drops quickly. Many cases can be cured or the symptoms reduced in severity by intramuscular inoculations of ATCH, administered by a veterinarian.

One Feed for Another

In substituting one feed for another in a ration there are a number of points which should be taken into consideration . . . .

Condensed from Rural New Yorker

F. B. Morrison

FEEDS OF THE same general class can usually be successfully substituted, one for the other, if the substitution is made with full consideration of any difference in chemical composition, nutritive value, and special characteristics, such as bulkiness or palatability. In substituting, it is important for the farmer, the mixed feed manufacturer, and the local feed dealer or mixer to have definite information about the actual relative values of different feeds for the various classes of livestock.

Nutrients As Measures of Value

The amounts of total protein, fat, and fiber in an ingredient or in a mixed feed provide useful information about its possible value, and these data are some check against substituting low-grade ingredients in a mixed feed for high-grade feeds. For example, a mixed feed with a high fiber guarantee and a correspondingly high fiber content will ordinarily have a decidedly lower value for stock fed for production than a mixed feed lower in fiber. It will accordingly be worth less per ton to the stockman. The usual protein, fat and fiber guarantees therefore serve a very useful purpose, and the feedingstuffs laws have done much to maintain the standards of the commercial feeds on our markets.

The simplest method of measuring the value of various feeds is, however, to compare the amounts of digestible protein and of total digestible nutrients that each furnishes. This is a better index to the feeding value than merely the total amounts of protein, fat and fiber. Nevertheless, in comparing concentrates and roughages, or high-grade and lower-grade concentrates, the amounts of total digestible nutrients do not give a true idea of the real productive values of the various feeds. This is because there is deducted, in determining the percentage of total digestible nutrients, only the loss that occurs in the undigested material in the feces. It is assumed

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that the remainder—the digested nutrients—is all assimilated and used by the animal. While there are decided limitations in the evaluation of feed on the basis of digestible nutrients, such values are the only basis of evaluation we have for many feeds.

Energy lost in digestion of feeds is mostly converted into heat, which, though it can keep an animal warm in cold weather, is valueless for productive purposes. The amount of total digestible nutrients in a feed may therefore not at all measure its value for milk or meat production. This is because a liberally fed animal ordinarily has more heat unavoidably produced in its body than is needed to maintain the body temperature. All losses of energy in the digestion and utilization of feeds are deducted in arriving at net energy values, or starch values, as they are called in Europe. Net energy values are therefore theoretically more accurate measures of the productive worth than total digestible nutrients. Unfortunately, it is very difficult and expensive to determine them. Therefore such values have been thus determined for very few feeds.

Feeding Experiments

To illustrate the fact that total digestible nutrients may greatly over-value certain feeds, let us compare good hay and wheat straw. Good hay supplies about 50 pounds total digestible nutrients per 100 pounds, while wheat straw furnishes 40.6. Is a ton of wheat straw worth 80 per cent as much as a ton of good hay for production of milk or meat? Again, the best grade of very leafy alfalfa hay has 52.7 pounds of total digestible nutrients per 100 pounds, and stemmy alfalfa hay with 36 per cent fiber has 46.2 pounds. Would you pay 88 per cent as much for stemmy hay as for the very leafy hay?

The average American ate 700 pounds of dairy products in 1955, and dairy leaders expect an increase of about one per cent in 1956. More gains are expected because of growing incomes, lower retail prices of some dairy items, expanding promotion activities and the special school milk program initiated in 1954.

The only way in which the actual productive value of any feed can be determined for a particular class of livestock is by actual feeding experiments under practical conditions with this class of stock. In such experiments the relative value of the particular feed can be found, in comparison with that of a standard feedingstuff.

To warrant safe conclusions, such experiments must be care-

fully planned and they must be conducted under controlled conditions for a sufficient length of time and with a reasonable number of animals. Also, several experiments are needed to determine reliably the value of a feed or a ration, because individual animals may differ rather widely in productive capacity. Furthermore, various lots of any feed may differ in composition.

Values May Differ

Experiments have shown that the actual value of a particular feed for two classes of stock may differ considerably. For example, a ton of good corn silage is worth 33 to 40 per cent as much as a ton of legume or mixed hay for dairy cows. On the other hand, for fattening cattle and lambs comparable silage has a higher value, being worth fully one-half as much per ton as good hay.

Similarly, ground barley is about equal to ground corn for dairy cows, but for swine or for fattening cattle or lambs its relative value is appreciably lower. Also, barley injured by the scab disease is satisfactory for cattle and sheep, but it is unsuited to horses and pigs. Another interesting example is the fact that cottonseed meal can be fed safely to cattle in larg amounts, if plenty of vitamins and minerals are provided. On the other hand, pigs should be fed only limited amounts of cottonseed meal, or disastrous results may follow. Again, uncooked field beans give satisfactory results when forming not too large a part of the ration for dairy cows, beef cattle, and sheep, but pigs do poorly on beans unless they are cooked.

In discussing the relative values of various feeds and the manner in which one feed may be substituted for another, I shall generally compare different low-protein concentrates with dent corn, and compare various high-protein supplements with either soybean oil meal or with cottonseed meal.

Substitutes for Corn

Oats are one of the most popular stock feeds and, when they are fed so as to take advantage of their special characteristics, they may be fully equal to corn in feeding value. Because about 30 per cent of good grade oats is hulls, oats supply only 70 per cent of total digestible nutrients in comparison with 80 per cent for No. 2 corn. Nevertheless, feeding experiments have shown that, when not over 20 to 25 per cent of oats is included in a mixture of rather heavy concentrates, ground oats is equal to ground corn in actual feeding value. On the other hand, if oats are used as the chief part of the concentrates in a ration for meat production, they are worth only 79 to 85 per cent as much per ton

as corn, and for dairy cows about 90 per cent as much as corn.

Barley is an excellent substitute for corn, furnishing slightly less total digestible nutrients but more protein. Experiments have shown definitely that for dairy cows, ground barley is equal to ground corn per pound. For meat production, barley is worth somewhat less than corn.

In 14 experiments with fattening cattle, ground barley has been worth, on the average, 88 per cent as much as shelled corn. Similarly, for fattening lambs, barley has been worth 87 per cent as much as corn. For pigs, ground barley is worth about 91 per cent as much as shelled corn. Deducting the cost of grinding, which is not necessary in feeding corn to pigs, whole barley is worth about 81 to 85 per cent as much as corn.

One-fifth of the original area of U. S. tillable land has been ruined for further practical cultivation, chiefly by erosion. About one-third of the present tillable land is already badly damaged by erosion, and more than half of the remainder is subject to erosion. Man-made erosion is dynamic and accumulative and has no end save complete destruction.

Numerous experiments have been conducted to compare wheat with corn for various classes of stock. When properly fed, ground wheat equals corn in value. Because wheat is a heavy, rather pasty grain, the best results may be secured when it does not form the chief part of a concentrate mixture. In using wheat as a feed, the fact that it is higher than corn in protein should be borne definitely in mind. Less protein supplement is needed with wheat than with corn.

When properly supplemented, the grain sorghums are excellent for all classes of farm animals. They are well liked by stock though they are sometimes less palatable than corn. Threshed grain sorghum is approximately equal to corn for dairy cattle and for sheep. For beef cattle and swine grain sorghum is worth 90 to 95 per cent as much per ton as corn. It should be ground for cattle but need not be ground for sheep or for growing and fattening pigs which are self-fed.

Ground rough rice may be used as a substitute for other grains. For dairy cows, work stock and poultry, it has been about equal to corn. For fattening pigs the value has been somewhat lower —81 to 85 per cent as much as corn. Rough rice has been least satisfactory for fattening lambs.

When any of these other grains —oats, barley, wheat, grain sorghum or rice—replaces yellow

corn for poultry, care must be taken to supply plenty of vitamin A value in the ration.

Protein Supplements

The various high-grade protein supplements may be used more or less interchangeably in rations when due consideration is given to their special characteristics.

Among the protein supplements of plant origin, soybean oil meal ranks at the top in quality of protein for swine or poultry. None of the other plant protein supplements furnishes protein so nearly equal in quality to that supplied by certain protein supplements of animal origin—dairy by-products, tankage or meat scraps or fish meal. Therefore, in feeding swine or poultry, soybean oil meal can be satisfactorily used as the chief or the only high-protein supplement if care is taken to supply additional minerals and vitamins.

In feeding dairy cattle, beef cattle or sheep, the kind or quality of protein in the ration is not of great importance providing that they get roughage of decent quality. Therefore, the various protein supplements may be used more or less interchangeably, the choice depending largely on the price at which each furnishes digestible protein and other nutrients.

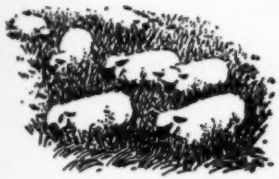
'Course of Empire' Moving Northward?

There is scientific belief that the world has moved into one of its warm cycles. Glaciers are in retreat, the oceans grow a little warmer, the fish are moving northward. Writing of these phenomena in "Encounter," Aldous Huxley remarks:

"If I had a few millions to invest for the benefit of my grandchildren, I would put them all into Canada rather than Texas. 'Westward the course of empire takes its way.' So wrote the good Bishop Berkeley two centuries ago. Reincarnated today, the philosopher-poet would probably turn his prophetic eyes 90 degrees to the right. Westward no longer, but northward, northward moves the course of empire. The tunas, the pilchards, the sharks and the codfish — these forward looking pioneers have already made the move or are at least swimming in the right direction. In ever increasing numbers, men will soon be following their example."

—From the Montreal Star

How To Improve Sheep By Breeding



Third article in a series about successful sheep management . . .

Condensed from Wisconsin Bulletin 470

FARM FLOCKS of 40 or 80 ewes are most profitable for Wisconsin. One ram is recommended for each 40 ewes. Production records show that one- or two-sire flocks use labor, feed, equipment and barn space most efficiently under most conditions. Such a flock is large enough to return a fair income and rate attention as a worthy sideline.

Ewes are generally bred in the fall between August and December. During this period, they come in heat about 16 or 17 days. Lambs are born approximately 147 days after ewes are bred. Most sheepmen do not make a practice of breeding ewe lambs. However, if the ewe lambs are healthy and strong, and weigh at least 90 pounds, they may be bred the same year they are born. They will mature approximately 6 months later but will produce more pounds of lamb over their lifetime.

Improvement Through Breeding

All permanent improvement is based on (1) selection of breeding stock and (2) sound culling. In grading up his flock, the sheepman must appreciate the fact that ewes differ widely as producers. Some have more twins than others. Some are better mothers and raise thriftier, faster-gaining lambs. Likewise, rams vary greatly in their capacity to sire profitable lambs.

Is it true that good feeding and better management will result in a larger crop of lambs that weigh more, grade higher, and shear heavier fleeces. But these improvements in nutrition and management do not become part of a sheep's inheritance, and are not automatically carried into the next generation. Lasting improvement can only be brought about by selecting parent stock with the best inheritance.

Most characteristics of animals are heritable. Some characteristics, of course, are more heritable than others. But only those that are most heritable and contribute most to income should be considered in a selection pro-

Reprinted from Wisconsin Bulletin 470, More Profit From Farm Sheep, published April 1956 by University of Wisconsin Extension Service, Madison, Wis.

gram. In deciding which sheep to cull and which to keep, consider only those characteristics that make sheep more profitable. Studies show that these are as follows—and in about the order listed.

1. *Rate of gain.* How fast lambs grow from birth to weaning, and to market age. Gains of ½ to ¾ pound per day are considered good.

2. *Twins* in preference to singles. (Twin lambs are generally 3 to 6 pounds lighter than single lambs at weaning time but should not be discriminated against for this reason.)

3. *Market grade.* Most markets sort lambs into about 5 grades — from best to poorest, mainly on the basis of degree of finish.

4. *Fleece weight* as judged by scale weight at shearing time or density and length of fleece on the animal.

5. *Freedom from wool blindness.*

6. *Early lambing* in preference to late lambing.

Sheep with obvious defects that affect profits (such as black fleeces, unsound udders) should be eliminated at selection time.

Measuring Production in Sheep

Wool and market lambs bring in most of the income received from the average flock. Consequently, ewe production is important.

How much each ewe produces is easily measured. (1) At shearing time, her fleece can be weighed with a small dairy scale. (2) Her ability to produce pounds of lamb in a short time can be determined by weighing the lamb (or lambs) at weaning age. Since a twin weighs almost as much as a single lamb when four months old, ewes raising twins obviously produce nearly twice as many pounds of lamb. Twin percentage therefore contributes a great deal to the ewe's total production.

According to the Forest Service, the average American uses about 80 cubic feet of wood each year, and lumber is used in greater amounts than any other industrial timber product. Each one of us, uses twice as much lumber as a Russian, four times as much as an Englishman, and six times as much as a Frenchman, and our use of paper also far exceeds that of any other country.

Cull Out Poor Ewes

Culling out ewes which look poorest after weaning or during summer is not good practice. Ewes that have twins and are good mothers may look small and thin. In contrast, ewes that fail to raise their lambs or give enough milk are usually fat. These

poor producers may look healthier, larger, and more vigorous, may even shear a little more wool, but for obvious reasons, are not suitable for breeding stock. Most flocks also have some ewes that are able to produce well and still keep in good condition. Selling all fat ewes would unfortunately eliminate these good producers. Only when he knows each ewe's production, can the sheep-raiser avoid being misled by appearances.

Ewes having the lowest performance should be sent to market. Some ewes must also be culled each season because of unsound udders or bad teeth which would make them poor risks.

Selecting Ewe Lambs

Replace cull ewes with ewe lambs most likely to develop into good producers. Production of the dam, especially if records are available for 2 or 3 years, and also the performance of the lambs, are best indications of inheritance for things that pay off in higher income. Fewer mistakes will be made this way than if they are selected on the basis of "eye-appeal."

A Sheep Improvement Program

The Wisconsin Sheep Improvement Program was developed by the University College of Agriculture to help sheep-raisers get production information on their ewes and lambs. These performance records usually reveal many important facts that might otherwise be overlooked at selection time.

The first step in keeping records is to identify each sheep permanently. Most sheep-raisers use an ear tag inserted shortly after birth.

The simple but satisfactory type of record card records the following information on the ewe record card.

1. *Ear tag numbers* of ewe and lamb, birth date, and sex of lambs.
2. *Weight* of the ewe's fleece at shearing time.
3. *Notes on defects*, abnormalties and deaths. The date when each record was made should also be included.

A fieldman for the program helps weigh the lambs and measures the length of their side fleece. This is done when the average age of the lamb crop is 4 months and takes about one hour for a flock of 60 lambs.

Each Ewe Receives Rating

After all records have been taken, the College of Agriculture calculates a production index for each ewe and lamb in the flock. Indexes are based on a system of points given for each factor considered in the selection of breeding stock. One ewe may shear a light fleece but be a good milker and raise a heavy lamb, while another ewe shears a heavy

fleece but has a slow-growing lamb. The index gives, in one figure, a measure of over-all desirability, all factors of production being considered.

After all flocks have been indexed, a flock analysis is sent to each owner. This shows him how his lambs and ewes compare to the averages for all the sheep in the WSIP during that year.

The program is not a contest between producers. It is designed so that sheepraisers can best help themselves improve their flock. Any flock owner in Wisconsin may join. For a sample ewe Record card, write the Animal Husbandry Department, College of Agriculture, Madison, Wis.

The Ram is Half the Flock

Tests show that lambs sired by a good ram may be worth as much as $2 more per head than those sired by a scrub ram. All things considered, his lambs will finish earlier and sell at a higher price per pound. One ram can normally service about 40 ewes. Because lambs inherit equally from each parent, it is clear that the ram is 40 times as important as the average ewe for improving the flock.

When differences in the lifetime production of daughters and later descendants in the breeding flock are considered, a good ram is even more valuable. *Buying a poor ram is one of the most expensive mistakes that a sheep raiser can make.* Because the ram contributes so much to the ewe flock, he too should be selected for characteristics that affect sheep income most.

Many purebred breeders are now keeping production records on their flocks. Much of the risk in future lamb crops can be removed by getting a ram that is a good individual himself, and is also out of a dam with proven production ability. Looking at the production records of his sisters can also be a helpful guide in selecting the future flock sire.

Bottle Message

During World War II a milk bottle fished out of the Pacific ocean was found to contain a piece of water-soaked paper. But the writing on the paper was too faint to be deciphered. Clearly, it was a case for the F.B.I.

Various tests were made and various acids applied. At last, six words stood out in startling clearness. They were: "Two quarts of milk, no cream." —From the L. & N. Employees' Magazine.

Systems of Breeding

Beginners frequently ask whether they should start with

a purebred or grade flock. Experienced sheepmen inquire about inbreeding, and whether crossbreeding has advantages. Several thoroughly tried systems are available; each sheep-raiser must choose according to his own conditions. However, flock improvement is helped materially by following a regular and systematic plan.

Many sheep-raisers go in for purebred flocks. To be classified as purebred, both the sire and dam must be of the same breed and registered (or eligible for registration) in the breed association registry. Purebred sires are used in most grade or commercial flocks.

In purebred flocks, linebreeding is quite widely used. This is a mild inbreeding system and is usually effective in fixing type and uniformity in a flock. Linebreeding is followed when the breeder wishes to relate his flock to a single outstanding animal. Successive sires used should have that animal in their pedigree several times, and in recent generations.

Producers of market lambs will find it more profitable to avoid all forms of inbreeding. However, if unrelated lines are crossed, the offspring are not inbred. Experiments with plants and animals show that the crossing of certain lines will increase production. This, of course, requires the breeder to find the lines that "nick" or combine well.

Crossbreeding

Crossbreeding means mating ewes of one breed to rams of a different breed. Crossbreeding systems which can be used are: the crisscross system using two breeds and the triple cross using three breeds. Choice of breed depends on the individual farmer. In general, it should be remembered that fleece weight, milking ability as shown by thrifty lambs, rate of gain and prolificacy are among the most important characteristics to consider in the ewe flock.

Suggested Breeding Program For Commercial Producers Having Two-Sire Flocks

Most of our present breeds have definite characteristics. Some are superior in wool production; others are superior in producing large, fast-growing lambs. Still others may produce lambs of excellent market conformation but not necessarily fast-growing. To combine the desirable features of each group, the following breeding plan may be used. The purpose of the plan is:

1. To develop a flock of ewes superior in wool production and milking ability.
2. To produce fast-gaining lambs by using a heavy mutton ram that has been selected for size,

rate of growth and mutton conformation.

3. To take advantage of the added production usually resulting from crossbreeding.

At breeding time, the ewe flock should be divided into two groups on the basis of production. Breed the best ewes to a ram selected for wool production, the other ewes to a mutton ram.

First Year

Mate Group A (best ewes) to a wool-breed ram.

Select ewe lambs for flock replacements from this cross.

Mate Group B (other ewes) to a mutton-breed ram.

Market all lambs from this cross.

Second Year

Breed original ewes from Group A to the wool-breed ram.

Select ewe lambs for flock replacements from this cross.

Breed original ewes from Group B to the mutton ram. Include any ewe lamb replacements (from Group A) that are large enough to breed (90 lbs. or more).

Market all lambs produced.

Third Year

Breed ewe lambs saved the first year and the best ewes from Group A to a ram from a different wool breed.

Save the best ewe lambs.

Breed the other ewes from Group A and B and ewe lambs saved from Group A to the mutton ram.

Market all lambs.

The same breeding plan can be repeated in following years. The mutton-breed ram can be used as long as desired because none of his ewe lambs will have been kept for breeding. However, the wool-breed ram should be changed every two years to avoid mating him to his daughters.

(To be continued next month)

Phosphate Best for Barn Floors

Superphosphates will be better than lime for use in the dairy stanchion barn this winter, says D. L. Murray, Michigan extension dairyman.

Lime releases nitrogen and makes the barn floor slippery. Phosphate ties up the nitrogen. This cuts down on the smell in the barn and gives the cows better footing. The manure will be worth more in the spring, too. Murray recommends about a half-pound of phosphate fertilizer per cow per day, spread in and a short distance behind the gutter. —*Michigan State University*

Farm Income Tax Management

What you can do to cut your income tax . . .

Condensed from New Mexico A. & M. Circular 276

John O. Kling, Extension Economist

Suggestions and explanations in this article are necessarily brief. Their main purpose is to help you recognize some of your tax problems and tax-reduction opportunities.

Details of many of these suggestions can be found in the latest "Farmers' Tax Guide," available free of charge from your county extension agent.

TAX MANAGEMENT OPPORTUNITIES

Farmers have many opportunities during the year to make business decisions that will affect the amount of their income tax. At the end of the year, it may be too late to take advantage of many of these opportunities.

1. If you sell your farm, consider using the installment-sales method to spread tax liability on gain over a period of years. This method can be used if payments received in the year of sale do not exceed 30 per cent of sale price.

2. If you buy a farm, promptly divide the total cost of the farm among (a) growing crops, if any, (b) depreciable improvements, (c) dwelling, and (d) land. Aside from a tax management viewpoint, the proper division of such costs may help determine what you pay for the farm.

3. Figure depreciation by the most appropriate method. Under the declining balance method, the largest deduction comes in the first year. Is it better in your case to recover costs quickly, or to spread them out against farm production over a longer period?

4. Plan personal deductions so that you can benefit by itemizing them one year, and then taking the standard 10 per cent (or $1000) the next year. For example, you could purchase your 1956 auto license in January 1956, and your 1957 license in December 1956. Other deductible items such as religious or charitable contributions, medical expenses, etc., that you would normally pay over a 2-year period, could be paid within one

Reprinted from Circular 276, Suggestions To Farmers on Income Tax Management, New Mexico A. & M. College, State College, New Mexico

calendar year and itemized as deductions for that year.

5. Erosion control expenditures and, certain other soil and water conservation practices, may within limits, be deducted as farm expenses instead of being capitalized. The deduction for such expenditures in any taxable year may not exceed 25 per cent of your gross income derived from farming during that year.

6. Plan optional expenditures for years of high gross income. The cost of painting buildings, minor repairs on improvements and equipment, small shop tools, seeding legumes and grasses, etc., do not come every year. However, these costs are deductible in the year they occur.

7. Pay wages to your children for work they perform on the farm. Such payments to your children can be counted as farm labor expenses, even though you list these children as dependents.

8. Give your children income-producing property—land, cattle, machinery—and let them report income from their work and capital. This is another way to spread family income over the lower brackets. *Family partnerships* are sometimes used to do this, but keep in mind that such partnerships, as well as gifts, must be legally sound to accomplish their intended purpose.

9. A joint return is often advantageous for married couples. The law provides a "split income" method of figuring tax on a joint return. This often means a lower tax than would result from separate returns.

10. Plan to construct needed grain-storage facilities before the end of 1956 (if not too late) to obtain the special 5-year write-off. This lets you charge off the cost over 5 years instead of depreciating it over a normal life of 10 to 50 years.

11. If you sell or cut timber, plan your operations to get the special capital gains treatment.

12. If you are 63 or 64, consider postponing income until age 65 to take advantage of the double personal exemption. However, if you are qualifying for social security, you probably will want to maximize your income in those years.

13. As you approach age 65, plan income from rents, dividends, interest, and pensions to qualify for retirement income credit.

14. In general, to minimize taxes over a period of years, plan your sales so you will have enough income each year to fully use the personal deductions and exemptions that you are allowed. Also, plan not to have wide fluctuations in income from year to year.

RECORDS THAT WILL HELP YOU

By keeping good records of all receipts and expenses, and by be-

ing aware of and taking advantage of all allowable deductions and exemptions, farmers can avoid paying unnecessary income tax dollars.

Successful tax management is based upon complete records kept regularly and carefully throughout the year.

1. Keep a record of the many *small-expense items* ordinarily paid for in cash. One way to help keep track of these items is to establish a charge account at places where you do considerable business during the year.

2. Keep records of *easily-overlooked deductible items*—bank service fees, interest payments, organization memberships, farm magazines, overnight business trips, portion of dwelling used for farm use, losses on household goods used by hired help.

3. Keep records to *identify the source of each deposit* item shown on your bank statements. Otherwise, your deposits of borrowed money, gifts, bonds cashed, and other non-taxable deposits may be counted as taxable income, if your tax returns are audited.

4. Keep records of all costs in connection with *hospitalization and medical or dental treatment.* Include necessary expenses for transportation, meals and lodging, and also premium payments on hospital and surgical insurance policies.

5. Keep all paid *bills, invoices, cancelled checks,* for at least five years—including checks used to pay income taxes. Pay all bills by check if possible.

6. Keep *depreciation* records of farm improvements, machinery, equipment, and purchased breeding, dairy, and work stock.

7. Your farm records may be set up on either the *cash or accrual basis.* There are advantages and disadvantages to each method. The cash method is simpler and more widely used, but the accrual method may be better suited to your particular situation.

With good records, you can easily determine your approximate net income at any time during the year. Then, if a preliminary check indicates your income will be unusually high, you might decide it would be profitable to delay certain sales beyond the end of the year, and/or increase deductible expenditures before the end of the year.

TAX REPORTING REMINDERS

Farmers often pay more income tax than is required by law. To a large extent, this happens because they overlook allowable expenses and deductions.

Remember, for every dollar of expense you forget or fail to enter as a deduction, you will pay at least 20 cents of unnecessary income taxes.

1. Theft and casualty losses—fire, storm, flood, auto accidents

—are deductible on non-business property as well as on business property. Casualty losses are deductible only in the year they occur. Theft losses are deductible in the year they are discovered.

2. Take advantage of a *net operating loss* in one year to reduce your taxable income in other years. A net operating loss can be carried back 2 years, and forward 5 years.

3. Do not report as taxable income such items as *gifts, bequests, inheritances;* certain types of interest, dividends, and pensions; social security benefits, proceeds received as beneficiary of a life insurance policy.

4. Be sure that you do not count *CCC loans* as income twice —once in the year borrowed, and the next year when the crop is sold, or as income in the year the loan is made. The option selected must be followed thereafter.

5. When you are *developing a farm,* you may capitalize or deduct as expenses the cost of upkeep, taxes, irrigation, fertilization, controlling undergrowth, cultivating, and tree spraying.

6. The *social security tax* you have to pay on wages you pay to your employees is deductible as a farm business expense, and not as a tax.

7. Take all allowable *depreciation* on purchased breeding, dairy, and draft livestock, as well as on all depreciable improvements, machinery, and equipment.

8. Deduct the cost of any *purchased livestock*—lost, strayed, or stolen, or which died during the year.

9. Breeding fees are one of the many allowable farm expenses.

10. Don't overlook the cost of licenses, insurance, depreciation, etc., on your *farm trucks and autos.*

11. Deduct the cost of electricity, gas, telephone, auto, etc., actually used in the farm business. In many cases, half is not enough.

12. In addition to the regular cash costs of operation, don't overlook the five types of *indirect or overhead expenses.* These expenses are sometimes referred to as the "DIRTI" five:

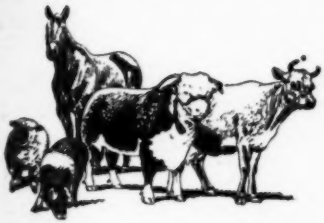
D—Depreciation
I—Interest Paid
R—Repairs
T—Taxes
I—Insurance

TAX MANAGEMENT vs. FARM MANAGEMENT

Tax management has some limitations. Therefore, wise farm management decisions should usually take precedence over tax management.

If decisions are made and business transacted solely in an effort to reduce taxes without considering other factors, net income after taxes may actually be lower.

$18,000 a Year on 260 Acres



This Indiana stock farmer uses a diversified livestock program and good management. The combination pays off . . .

Condensed from Breeder's Gazette

Simon Swartz

ROLANDES Liechty, Adams Co., Ind., specializes in dairying, but also raises hogs, sheep and chickens. "It is my pasture program that is paying off," he says. "I am now producing more and better pasture on one acre than I did on 2 acres a few years ago."

For 6 of the last 11 years Liechty's Holstein herd has topped his County D.H.I.A. Last year his 16-cow herd averaged 15,103 lbs. of 3.8% milk. His return per cow above the cost of feed was $381.95, nearly $40 per cow higher than the second-place herd. The return for each $1 invested was $2.91.

Liechty first became interested in better pasture when he was a renter. Indeed, that is where his present herd was started, with two foundation cows. Today, he owns a 124-acre farm which he is constantly improving.

When he bought this farm, the soil was rather run-down. However, the farm he rented had been built up through several years of growing legumes, spreading lime and commercial fertilizer. He hesitated to move his herd to his present farm before he had built it up too. So he made arrangements to keep his herd on the old farm for a couple of years until he had a chance to get some of his practices started on his present farm. When he did move the herd there was very little drop in production.

This year Liechty has 38 acres in grass for pasture and hay. A small plot of ladino pasture is reserved for his hogs, while 15 acres of pasture carry his dairy herd through the summer months. For pasture he uses a combination of ladino-brome-alfalfa and some timothy. His pasture field is divided into 5-acre plots by electric fence. One plot is grazed for a few weeks, then clipped and allowed to regrow. In this way Liechty always has lush pasture.

Even in the hot and often dry months of July and August,

Reprinted by permission from Breeder's Gazette, Spencer, Indiana

Liechty has plenty of pasture. He seeds the pasture mixture in his oats crop; usually gets some grazing the first year after the oats are off. But he likes to have his young grass go into the winter months at least 3 inches high. The next spring, or late winter, he top-dresses with commercial fertilizer, often at the rate of 500 lbs. per acre.

The fertilization program carries on to his other crops. The grass fields are retained for 2 or 3 years, then plowed and put in corn. Liechty's corn usually averages more than 100 bushels per acre. After one or two years in corn, the fields go back into oats and then grass again.

For hay Liechty uses the same mixture as for pasture. He chops or bales the hay. He has a silo and changes off between corn or sorghum silage and grass silage. He likes grass silage because so often when he wants to make the first cutting of hay the weather is bad for curing; so he puts it in the silo. He notices little differences between grass and corn silage as far as production is concerned, but the cows seem to enjoy the grass silage a little more.

Liechty's grain ration averages 14.5% protein. He feeds grain at the rate of 1 lb. to each 4 lbs. of milk. The grain ration consists of corn, oats, soybean meal and bonemeal. Salt is added with minerals and molasses as needed.

In addition to his own 124-acre farm Liechty operates his father's farm of 140 acres, a total of about 260 acres. But his pasture program is so impressive that he needs only from 35 to 40 acres for pasture, hay and grass silage.

In addition to his milking herd, Liechty keeps 50 breeding ewes and markets a sizeable number of lambs each year. He keeps 10 brood sows and sells about 200 shotes a year.

As of early April, Liechty was selling his Grade A milk at $4.40 per 100 to a local dairy. He told us that it is not enough; with the present price on what you have to buy, the milk price should be at least $5.00. Even so Liechty is making money.

He believes that the future holds promise for the general livestock farmer. The consumption of milk and meat is going up and he feels that the farmer who keeps his overhead down and production up is going to keep on making money. In 1955 his milk brought him $6,000, above the cost of feed. Out of this comes the overhead, such as veterinary expense, but he still gets a pretty good annual wage. In addition the sale of hogs and lambs and wool and grain from the farm brought in $12,000 additional, on which there was a fair profit.

Ship Milk Products Without Refrigeration

A new process makes it possible to ship and store canned, sterile milk and other milk products without refrigeration . . .

Condensed from Kansas Farmer

Dick Mann

TWO MAJOR PROBLEMS of the milk producing and consuming world already may have been solved in Kansas by the Arkansas City Co-operative Milk Association.

The two major problems are: how to dispose of surplus milk and how to get whole milk distributed to millions of people in the world who need it but who live in areas where no milk is produced or where refrigeration is not possible.

I say these problems MAY have been solved, because it is too early to say for sure. But, the Arkansas City Co-operative Milk Association plant has developed a secret method for processing canned sterile milk and other milk products without use of additives. These products can be shipped anywhere in the world and kept indefinitely without refrigeration! Here's the story:

Carl Fitzgerald, manager and developer of the new process says: "Our canned sterile milk has qualities of fresh milk, retains taste of the fresh-bottled product and is homogenized. We have cans of this milk in our plant that have been on the shelf for 15 months without refrigeration, and milk is as sweet and good as when canned. Heat causes no bacterial change in the milk but temperatures above 70 degrees do affect the flavor. Therefore, we recommend it be stored at temperatures below 72 degrees F."

Other milk products being canned with this secret process include a chocolate flavored drink, half-and-half, skimmed milk and an ice cream mix.

Biggest customer for the new product so far has been the U.S. armed forces, says Mr. Fitzgerald. "During the last 12 months the army has purchased about 1¼ million quarts of canned sterile whole milk. We ship this by the carload in 24-can cases." The day I visited the plant a carload of canned sterile milk was being

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shipped to Seattle for transshipment overseas by the army.

"These canned products never will replace fresh milk," Mr. Fitzgerald explains, "but we think they will be a wonderful boon to folks who can't get fresh milk or who do not have modern refrigeration available to keep milk and milk products. Mining and logging camps, for instance, usually are in areas where fresh milk is difficult to get. There are many other groups of people who have similar problems when it comes to obtaining fresh milk. Canned sterile milk may be the answer. At least, we think it is."

Safety records show that about one-third of all tractor fatalities occur on public roads.

Canned sterile milk, processed under vacuum, already has been shipped to all parts of the world for experimental purposes. "The product has been subjected to all ranges of temperatures from those in Arabia and Lebanon to Alaska," Mr. Fitzgerald explains. "So far, it has met every test."

Present commercial supply of the new products is going to grocery stores in a few larger cities for sale to tourists, campers and others who have difficulty buying fresh milk. Capacity of the Arkansas City plant, which is the only one in the world to our knowledge now producing canned sterile whole milk using this secret process, is 10,000 quarts daily.

Many problems have been encountered in trying to develop this new process. First successful attempt was achieved by L. T. Winger, of Denver, working with research scientists at Colorado A. and M. college. They developed what was known as the Winger process. When the Arkansas City plant went into production the Winger process was first followed. "Later we began our own experiments and, after 3 years, came up with the process now being used," says Mr. Fitzgerald.

"Most of the processing and canning equipment had to be designed and built, since no such equipment was available on the market. This was slow and expensive, and our machinery still is undergoing changes in design to get more speed.

"We also discovered that cans used for holding other food products would not work for milk because of lactic acid in milk. The American Can Company did research on this part of the problem and came up with a plastic-lined can that does the job."

A major problem in making these new products popular is cost of packaging, Mr. Fitzgerald points out. "At present," he says, "our packaging costs on

small quantities runs up to about 4 cents a quart above that for packaging fresh milk. However, sales costs are reduced and, in large shipments, we can sell canned sterile milk for about 2 cents a quart over fresh milk. This makes the product competitive in areas where fresh milk is high in price and the cost certainly is not prohibitive where fresh milk is not available at all."

This new process has passed the most severe early tests, and it may hold great promise for the dairy industry and for milk-starved millions in the forseeable future.

Humane Slaughtering

Two hundred and eighty million animals are slaughtered each year to feed Americans, and by primitive methods that cause great suffering.

Cattle, like horses, are slugged with iron mallets. The first blow frequently fails to stun them, and, as they stumble, electric shocks force them to their knees so that they may be struck again and again Calves, hogs and lambs are strung up by chains tied to their hind legs. When the chains slip, or legs are disjointed and broken, they crash from high conveyor lines to the slaughter house floors.

None of these methods is necessary today. Hogs may be anesthetized by carbon dioxide gas; cattle can be stunned painlessly and with certainty by captive bolt pistols — techniques used throughout western Europe. As long ago as 1893, Switzerland enacted legislation requiring animals to be rendered insensible before slaughtering. Eight other European countries followed suit. In contrast, most American meat packers have stood fast.

Captive bolt pistols are rejected by our packers because earlier models reduced the market value of the animals' brains which are sold as meat to low income groups. Later models leave their brains intact. Carbon dioxide units are scorned by the major packers because they are "uneconomic." But two United States companies which now use these units compete successfully with the major packers today.

Recent tours of plants establish that they have made no advances toward humane slaughtering in 40 years. The patience of the humane societies has been exhausted. On their behalf Senator Hubert Humphrey (Dem., Minn.) has introduced and guided through senate hearings a bill to require humane slaughtering of animals within five years.

—From the New Republic

Are You Protecting Your Heirs?

Do these typical cases fit you? Are you making these mistakes?

Condensed from Farm Management

Robert D. Walker,
Valley National Bank, Phoenix, Arizona

ONE OF THE amazing paradoxes of the American way of life is that men will devote years of hard work to the accumulation of an estate for the benefit and protection of their families—but won't spend a day (or even an hour) on plans that will protect their estates and beneficiaries—taxwise and otherwise!

Next to signing a marriage license, a will is probably the most important document you will sign during your lifetime.

I try to get people to consider wills as insurance policies—rather than as something to be considered when you think you are ready to depart from this life.

Death generally creates several ascertainable liabilities that can be insured against by a properly planned will, or other estate plans. The fee you pay an attorney for drafting your will from time to time will no doubt be the cheapest insurance coverage you pay for, considering the known risks involved.

The drafting of a will is the "practice of law" and only lawyers admitted to practice are permitted to draft wills for others.

In recent years many changes have been made in tax laws, and unless estate plans have been reviewed in the light of these changes, they may result in excessive tax liabilities.

Let us consider the effect of a few cases, small and large. Bear in mind, however, that state laws are not uniform, which is another good reason why you need the advice and aid of a lawyer experienced in estate planning.

Case No. 1
Father, Mother and Grown Son

The parents own a farm worth $200,000. The son has been operating the farm with his parents for many years under an informal partnership agreement whereby he took one-third of the operating profits, but he had no vested interest in the land. The parents have wills leaving the farm to each other and then to the son

Reprinted by permission from Farm Management, Los Angeles, California

upon the death of the survivor. Let us assume that the father dies first and that the mother dies six years later. The Federal estate tax on the father's estate will be $4,800 plus expense of probate. If the farm is still worth $200,000 when the mother dies, the Federal estate tax on the whole thereof will be $32,700, less a credit of 40% of the $4,800 tax paid on the father's estate, or $1,920, leaving a second net tax liability of $30,780, plus further probate expenses. The program will result in total taxes on both estates of $35,580.

Now let us see what a little intelligent planning may accomplish. The parents make a gift of an undivided one-third interest in the farm to the son at a valuation of $66,666. They apply their respective gift tax exemptions of $30,000 each, and their respective annual gift tax exclusions of $3,000 each, leaving excess gifts of $666 taxable at 2¼% or total gift tax of $14.98. The parents revise their wills so that they each leave their remaining one-third interest directly to the son.

If the value of each parent's remaining estate is $66,666, and there are funeral expenses or administration totaling $1,666, the Federal estate tax on the remaining $5,000 (after the $60,000 exemption) would be only $150.

The total estate and gift taxes on this program would amount to only $314.98, thereby effecting an over-all tax savings of $35,000. Furthermore, the expenses of probate would be proportionately less on the survivor's estate.

Case No. 2
Husband and Wife in the 60's

The couple has two married children. Husband dies without a will. Community property estate of $400,000 including a farm worth $350,000. Husband's half interest descends to children. The neighbors commiserated with the widow because her husband had failed to make a will leaving her his half of the farm, and suggested that she ask the children for quit claim deeds, which the children gave without seeking competent advice. The children later discovered that they had made a taxable transfer to their mother with a gift tax liability of about $6,000 for each child. The mother then discovered that she could not give the one-half interest back to the children without paying another gift tax of about $24,000, which she didn't have inasmuch as it took all the other assets to pay estate taxes and administration expenses on her husband's estate. If the widow leaves an estate of $350,000 upon her death, the Federal estate tax will be $77,000, which is about $45,000 more than it would be if she had let the chil-

dren keep the shares they inherited upon their father's death.

Don't rely upon inexperienced advice.

Remember these important points in making your will:

Revise a will after marriage, divorce, or the birth of each child.

Destroy a will that is no longer appropriate.

Designate alternate beneficiaries and alternate or successor executors.

Disclose all the facts to the draftsman of the will.

Consider the tax consequences.

Take advantage of Federal Gift Tax exemptions and exclusions.

Check the precise form of registration of titles to property.

Provide liquidity for estate taxes and expenses of administration.

Properly program life insurance settlements.

Consider the use of trusts under wills.

Case No. 3
Another Proposed Gift Case

This one adds up several other tax problems. A husband and wife in their 70s with one son. The parents own an 80-acre citrus grove worth about $80,000, and possess about $20,000 in other assets. The parents homesteaded the land and have a low cost basis not exceeding $8,000. The parents have expressed their intent to make a gift of the grove to the son in order to save unknown death taxes and probate expenses, and also to be relieved from management responsibilities on the grove. The son made inquiry about the tax effect of the proposed gift and found out several important things:

(a) That it would create a gift tax liability on the fair market value in excess of the gift tax exemption of $30,000 and annual exclusion of $3,000 on each parent's share.

(b) That on such gift he would step into his father's shoes as to adjusted cost basis of $8,000, and if he sold for $80,000 he would have a capital gain of $72,000 with income tax liability on one half thereof.

(c) If he inherited the grove from the parents upon their respective deaths there would be no Federal estate tax, as the value of each estate would be under the $60,000 death tax exemption.

(d) The appraisal on the grove in the estate of the first parent to die would create a new adjusted cost basis for both the decedent's half and also the survivor's half. The son and the survivor could then sell at the appraised value without any capital gains tax on either share.

The foregoing tax angles were

too complicated for the parents to absorb and they still wanted to give the grove to the son in order to get out from under the management responsibilities. So, the son was advised to lease the grove from the parents and pay them a rental of $2,400 per annum. This rental would be within the parents' personal exemptions for income tax and the son could deduct the rental on his tax return. Furthermore, if the son ran into operational losses, he could deduct them against other income, whereas the parents would have no such tax offset available.

It pays to seek competent advice before acting.

Case No. 4
Husband and Wife with No Children

Several years ago they purchased 120 acres of desert land at $100 per acre out of community funds with the idea of moving onto the land when the husband retired. The husband became ill. Friends suggested that they put the title to the land in joint tenancy to avoid the expense of probate. The land rapidly increased in value due to industrial development in the area. The last bona fide offer they had eight months prior to the husband's death was $80,000. They had about $20,000 in other assets and $20,000 of insurance on the husband's life, or a gross estate of $120,000.

By using the $80,000 figure on the land, the widow avoided paying any Federal estate tax on the husband's half of $60,000, as that is the amount of the Federal estate tax exemption. Within a year after his death the widow was offered $100,000 for the property but she wanted $120,000. She did not elect to use either increased value on the Federal estate tax return, which she should have done. Shortly thereafter, she sold the 120 acres for $1,000 per acre.

Tax results: On the husband's half she acquired a new cost basis of $40,000 by reason of the estate tax appraisal, which resulted in $20,000 capital gain, or $5,000 income tax. On her half she had to use one-half of the original cost or $6,000, which resulted in $54,000 capital gain, or $13,500 additional income tax.

Mistake No. 1: If the widow had used her asking price on the estate appraisal, she would have paid an estate tax of $1,600 on her husband's half, but she would have saved $5,000 on capital gains tax.

Mistake No. 2: If they had left the title stand in community property instead of switching to joint tenancy, she would have acquired a new cost basis on her half equal to the appraised value on the husband's half ($40,000). which would have resulted in a

savings of $8,500 in capital gains tax on her behalf. (Note: the tax results would have been different if the joint tenancy had been created out of the husband's separate property.) If they had left the property in community and used the $120,000 for estate tax appraisal on the land, the widow would have saved $18,500 in capital gains tax, less $1,600 cost on estate taxes.

Furthermore, if the husband had made a will leaving his community half interest in the land to his wife as trustee during her lifetime, giving her power of sale and reinvestment and the use of the net income, and designating remainder beneficiaries upon her death, it would have removed $60,000 from the wife's future taxable estate, with a potential savings in estate taxes of $10,000.

(1) Beware of joint tenancies taxwise and otherwise.

(2) Weigh effects of appraisals for Federal estate tax.

Effective and efficient estate plans are best accomplished by the team work of your attorney, your tax accountant, your life underwriter and the trust department of your bank. The combined abilities and experience of this group should result in a well-balanced program taxwise and otherwise.

Price of Steel Farm Scrap at All Time High

Farmers and organized rural groups seeking to raise money will find there has never been a better time to collect farm scrap. Scrap prices have been mounting, adding to the cost of producing steel. As of October 1st they were as high as $69.00 a ton delivered to steel mills. While the farm price of course will be considerably below this figure it still offers a ready course to raising money from abandoned farm machinery, old trucks and the like around the farmyard or at rest in backyards of small communities. Out of the difference between the price paid for scrap to the farmer collecting it and the price paid at the mills must come transportation, collection, preparation, sorting and selling costs. These costs vary in different parts of the country.

Local organizations needing to raise money will find this a good time to put on a scrap drive. The larger quantities thus collected will command a better price. Churches, volunteer firemen, FFA chapters, 4-H clubs and service clubs in town have all found scrap collections a good money raising medium.

—Republic Steel Extension Bureau

Correct Type Means Long Life

Seldom do young cows with weakly attached udders, strutting teats and faulty legs and feet give long lifetime production . . .

Condensed from Western Dairy Journal

Dr. D. L. Fourt,
University of Idaho

PROFITABLE dairy production is measured by long lifetime production, and not by the first lactation. For it takes the average cow at least one and usually two lactations to pay for three or four years of feed and labor. Seldom is much profit returned until the third lactation. Long life-production is correlated with type.

A successful breeding program needs both type and production. And it must be built from cows—and cow families—and sires which will transmit those desirable type points that are associated with longevity.

Cows that wear and produce at a high level year after year until 10 or 12 years of age usually have certain type characteristics which set them apart from cows that produce for only 2 or 3 lactations.

Faulty Type

Surveys show that the average DHIA cow is between six and seven years of age, or has milked about four lactations. There are many reasons why the average cow does not remain in the milking herd longer, but faulty type is one reason.

There is ample research to support the belief that attachment, shape and quality of udder, and strong legs and feet have a close kinship with longevity.

Let's look a moment at what's considered production-type. For, there are certain points of type usually associated with production, and other points of type which contribute to beauty.

A level rump certainly increases beauty. But is isn't closely associated with production. On the other hand, dairy character, attachment, shape and quality of udder, body capacity, and proper legs and feet are associated with production and wearing ability. They add to the beauty of the cow, too.

Shorten Production

Unfortunately, weaknesses in

Reprinted by permission from Western Dairy Journal, Los Angeles, California

production-type are inherited.

A young cow that has strutting teats, a weakly attached udder, or faulty feet and legs inherited these weaknesses from her sire or dam—or maybe both. These type weaknesses usually don't affect production on the first lactation. But they definitely shorten the productive life of the cow.

Serious consideration should be given to the type defects of first calf heifers.

Often these type defects are over-shadowed by the first lactation production. But such cows with type defects usually have a short productive life. And their offspring often inherit the same weaknesses.

Using such animals slows down herd improvement and adds nothing to the development of long-lived, profitable cows.

More consideration also should be given to the type faults of the dam, half sisters and granddams in selecting herd sires in order to correct these type defects.

Sire Selection

One of the problems in selecting proved sires is type weaknesses that do not show up in the production records of 2-year-old daughters but often shorten their lifetime production. These type defects frequently are overlooked when a breeding program is based on production alone. And the result often is a herd heavily bred with defects that seriously interfere with long lifetime-production.

There is another factor to consider, too. Udder defects often increase labor in milking and caring for the cows.

Cows with broken udders, strutting teats or hard meaty udders usually do not milk out well. And they demand more time and labor.

Seldom do we get long lifetime-production from young cows with weakly attached udders, strutting teats and faulty legs and feet.

Tied Together

Correct type in dairy cows and ability to wear go hand in hand.

A study of Holstein cows that have produced more than 100,000 lb. of milk and also have been classified for type, usually have type ratings of "very good" or "excellent." These high type ratings are not given to cows with type defects.

Herd replacement is less when correct dairy type improves. And when fewer replacements are needed, there is greater opportunity for selection, and more surplus cattle for sale.

Cow families are built from cows with correct type which makes is possible for the cow to wear and continue to produce at a high level year after year. Seldom is a cow family built from a young cow with a broken udder or faulty legs and feet.

Bigger Pigs at Less Cost

The enzyme pepsin has shown remarkable results when added to the feed of baby pigs . . .

Condensed from Nebraska Farmer

PEPSIN for baby pigs holds the promise of giving farmers 50-pound pigs at eight weeks of age.

The enzyme, produced from the stomachs of slaughtered hogs, has been added to baby pig feed along with soybean protein. The results are earlier weaning and faster gains on less milk for pigs between 10 and 25 pounds.

Walnut Grove Products Company of Atlantic, Iowa, with tests of pepsin-fortified baby pig feed out on four Iowa farms, explains that the enzyme breaks proteins down into usable amino acids for the baby pigs. The natural pepsin in baby pigs' stomachs occurs in very minute amounts, and increases as the pig grows. Walnut Grove officials say the pepsin added to the baby pig's ration helps him make better use of his feed, and hence produces the amazing gains.

When the pigs reach the 25-pound stage, the natural pepsin has increased to the point where further addition in the feed does not increase gains, according to experiments in progress since last December.

Previous tests at Iowa State College showed that with five pounds of pepsin added to a ton of feed, the pigs could be fed three-cent-a-pound soybean protein to replace 15-cent-a-pound dried skim milk. Savings were figured at $30 to $40.

The Walnut Grove people are adding pepsin to a 20 per cent milk ration instead of replacing all of the milk. Farmers who are trying the fortified feed on an experimental basis like the way the pigs go after the pelleted feed.

A famous big game hunter was once asked to name the most dangerous animal on the American continent. His answer—a Jersey bull.

Roy Bailey of Atlantic showed a pen of 20 pigs that averaged 32 pounds at six weeks. The biggest weighed 38 pounds. They had been weaned at about 10 pounds between two and three

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weeks of age. He also had 65 pigs weighing 17 pounds at three to four weeks of age.

Nels Fuglsang of Atlantic showed a group of pigs that gained 10 pounds per pig between their fourth and fifth week for a feed conversion of 1.39 pounds of feed per pound of gain.

Byron King of Lewis, Iowa, has 28 pigs that averaged 44 pounds at six and a half weeks of age, with the heaviest weighing 51 pounds. This group was weaned at 15 pounds when a month old and started on pepsin-fortified feed, and carried for 17 days before being switched to a growing ration.

Emery Hoegh of Atlantic has three groups of pigs on the fortified ration. Several weighed 18 pounds at four weeks of age. He said the sows tended to hold them back, but once weaned, they really "took off."

Predictions are that the cost might be roughly $24 to $26 a ton for pepsin-fortified feed. The pigs will eat about 25 pounds each, which would make the cost in the neighborhood of $2.50 per pig.

It will probably be several months before pepsin-fortified feed is on the market.

Should Figure Income Carefully This Year

Farmers who will be 65 years old in 1957 have only 1956 left to qualify for social security benefits, reminds Willard T. McAllister, farm management specialist at the University of Delaware. He suggests that they figure their income extremely carefully this year.

A larger income this year will mean paying a bigger social security tax, he points out. But a farmer reaching the age of 65 during the coming year should be able to get back his tax payment many times over in terms of retirement benefits.

The amount of the retirement benefits an insured person will receive is determined by his average earning prior to retirement, McAllister notes. For example, by paying as little as $20.00 more in social security taxes this year it is possible for a farmer and his wife to boost their retirement income by as much as $20.00 a month for the rest of their lives.

There are several proper and permissible ways that taxable income can be increased this year, says McAllister. For example, by selling the poultry flock, grain crops, pigs and other animals raised for market before January 1, 1957 and by deferring certain purchases or payments for purchases until after the first of the new year, it is possible to increase income. *—Delaware Extension*

Specialization Pays Off

This young Iowa farmer finds that in times of falling prices it pays to specialize . . .

Condensed from Nation's Business

Gordon McCleary, Iowa Farm Bureau

THE FACT that too much farm productive capacity is tightening competition within the business is causing many farmers to change their ideas on specialization versus diversification.

One Iowa farmer who took the jump to specialization — Grade A milk production, to be exact—believes that today the advantages of concentrating on one enterprise outweigh the disadvantages. He's Alvin Vander Wilt, a 27-year-old farmer near Oskaloosa.

"No matter how tough the dairy business gets," says Alvin, I'm going to be in a comparatively better position than the fellow who isn't set up for maximum efficiency."

And miximum efficiency is definitely the keynote of Vander Wilt's dairy operation. In addition to farming the 120 acres, tending a small herd of pigs (it's getting smaller as the dairy takes up more of Alvin's time), this young farmer milks 44 cows. Naturally, the 8-hour day isn't in effect, and Mrs. Vander Wilt often gets the cleanup job. But that doesn't alter the fact that Vander Wilt is set up to make the most of his time.

Last summer, he was milking only 10 cows. The cream went to a nearby creamery; skim milk to his 150 hogs. In late July, the barn burned. That, plus the urgings of a neighbor that Alvin try the Grade A market in Des Moines, 60 miles away, provided the necessary impetus for a change.

How does one man tend 44 dairy cows and farm besides? As might be expected, a milking parlor is used. The most outstanding feature, however, is feed handling—or rather, the lack of handling.

Feed preparation is centered in a concrete tile granary. Here

Reprinted by permission from Nation's Business, Chicago, Illinois

is storage for 4,200 bushels of ear corn, with bins for shelled corn and oats overhead. With the grinder in the driveway, everything but the protein supplement runs into the mill by gravity.

Mr. Palmer, Sales Consultant for GM and other large firms, says it is almost unbelieveable that there is so very little difference between the good man and the very good man. Their analysis shows this to be that the extra good man will do "just a little bit extra." That is their conclusion. Many have tried it and it works. Just a little bit extra.

—Do-Well Timely Hints

Feed dumps directly into a self-unloading wagon.

It's about 150 feet to the dairy barn. To dump the feed, Vander Wilt pulls up beside a weather-tight box attached to the barn. A 30-foot long auger runs from this box to twin overhead bins located above the milking parlor.

He lowers the wagon spout, after removing the box cover, and switches on the inside auger. With the wagon auger going, it takes ten minutes to do the job.

Each of the two overhead bins supplies two swinging hoppers in the parlor below. These hoppers swing out of the way when cows are being let in or out. Before each milking, Vander Wilt opens the chute and gravity again fills the 86-pound hoppers. A crank on the side of the hoppers meters feed into a cup, one pound at a time.

Milking time starts at 5 a.m. and is usually over by 7:15. Each cow gets her udder washed before one of the three milker units is put on. Meanwhile, she's getting her feed. When she's finished, Vander Wilt pulls a rope that opens the door into the loafing area, swings the feed hopper aside, and he's ready for the next cow.

Alvin feels he could save considerable time if he could pipe

Pruning the lower branches off young pine trees can boost the value of each as much as $15 to $20 by allowing the development of clear, knot-free wood.

milk to the adjacent milk house, but he plans to wait until he can ship bulk milk before making the switch from pails.

The loafing area—milking parlor combination saves plenty of manure handling. The entire area can be cleaned with a tractor loader, and the spreader can be pulled right into the barn.

Assuming that Vander Wilt can efficiently handle 44 dairy cows, the big question is "Does it pay?" Located in the heart

of a hog and cattle feeding area, Alvin really appreciates the way dairying has paid off since he specialized. Dairy milk production in May was about 1,700 pounds, and at about $4 a hundred (blended price), the investment is bringing a good return and also paying Vander Wilt a good wage.

Some farmers might lose a little sleep having so much of the farm income dependent upon one operation. Alvin doesn't. He's in an area of growing population; the Iowa Dairy Promotion Association and the ADA are both doing good work to boost use of dairy foods. And a recent Iowa study also proved what we have known for a long time: More protein and calcium is needed in both adult and child diets.

Most important, specialization makes labor-saving equipment practical. With that fact on his side and with careful management and planning, Vander Wilt can withstand the "downs" and capitalize on the "ups" in farming.

Income Tax Change Aid To Farmers

Income tax laws have been amended to provide that livestock used for workstock, breeding, or dairying purposes which are sold because of drought conditions will qualify for treatment as an "involuntary conversion," reports George Campbell, extension economist for the University of Arizona.

Capital gains on the livestock will be exempt from taxation if the following three conditions are met.

(1) The animals must have been sold entirely because of the drought.

(2) The livestock qualifying for involuntary conversion can be only those in excess of the number which the taxpayer would sell if he followed his usual business practices.

(3) The farmer must elect to treat the sales of drought-stricken livestock as involuntary conversion on his income tax return and must replace the animals sold with animals purchased for the same purpose within one year after the close of the year in which the conversion occurred. However, upon application by the taxpayer, the Secretary of the Treasury has the authority to set a later date for making replacement.

The special tax treatment applies to livestock sold after December 31, 1955. The new law does not apply to poultry.

—University of Arizona

Can We Change the Weather?

Is rainmaking possible? Read this report by the man who should know . . .

Condensed from Soil and Water

Howard T. Orville, Chairman of the President's Advisory Committee on Weather Control

RAIN increasing, often incorrectly called "rain making", gained world-wide recognition and a status of scientific respectability in 1946. In that year, two scientists, Dr. Irving Langmuir, a Nobel Prize winner, and his associate, Dr. Vincent Schaefer, caused a man-made snow storm by seeding a wool pack type cloud over western Massachusetts with carbon dioxide (dry ice-pellets).

This historic flight was soon followed by other reports in many sections of the country publicizing the dramatic effects of seeding clouds to cause rain or snow storms. Then controversy developed as to whether the rain that was caused by the seeding was sufficient to be of economic benefit. This controversy is still raging after ten years.

During 1951 and 1952 almost 20% of the total area of the United States was the target of rain increasing operations and it is possible that a much greater area may have been affected. Since that time cloud seeding operations have amounted to $3,000,000 to $5,000,000 annually in the United States alone. Many foreign countries have cloud seeding projects patterned after the methods used in the United States.

Since rain increasing operations might cause damaging floods or destructive storms which would far outweigh the possible benefits of increased precipitation, Congress soon became interested in this problem and by 1951 several bills had been introduced in both Houses of Congress providing for some form of regulation of rain increasing or commercial cloud seeding operations as they became known.

Extensive hearings were conducted over the next two years and in 1953 a bill was passed by Congress which became Public Law 256. This law set up an 11-man committee, the Advisory Committee on Weather Control, composed of five members from

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private life of recognized standing in business, science and agriculture and six members from interested departments.

The law directed the Committee to, "Make a complete study and evaluation of public and private experiments in weather control for the purpose of determining the extent to which the United States should experiment with, engage in, or regulate activities designed to control weather conditions."

Horse Thief

A Texas posse had caught up with a horse thief and was about to execute the law and the man. Just before the hanging, one of the vigilantes with a sense of reverence stepped forward to pray.

The leader of the posse interrupted. "You've got a nerve," he said. "Trying to get this here varmint into heaven when he ain't even fit for Texas."

—Atlanta Constitution

The Advisory Committee began its work in December 1953. It was handicapped by lack of funds until July 1, 1954 and did not complete assembling a technical staff until January 1955. However, during this time it was able to complete a survey of rain increasing operations in the U. S. and to obtain information and first hand reports of cloud seeding operations in other countries of the globe.

The difficult problem is to determine whether present cloud seeding techniques actually do cause an increase in precipitation and if so, how much. Then there is a question raised by skeptics that rain increases attributed to cloud seeding operations would have occurred by natural process if seeding had not taken place. To complicate the problem further, silver iodide, which is released from ground generators, is invisible and we are told by scientists that the decay rate of these particles when exposed to bright sunlight and high temperatures is extremely high. This means that particles of silver iodide would no longer act as freezing nuclei for starting the development of a raindrop. Then since temperature and wind conditions are often extremely variable there are many times when the air currents would not be favorable to carry the particles from the ground generators to the clouds.

In an effort to find answers for these questions and many others, the Committee's evaluation program is proceeding along two principal fronts: (1) a statistical evaluation program to analyze the rainfall data, and (2) a physical evaluation program to

check the validity of the field operations.

The statistical evaluation is carried out to determine whether cloud seeding actually increases precipitation over that which would occur naturally if no seeding had taken place. Unique methods of evaluation using standard statistical techniques were developed by the Committee's technical staff.

The housefly, one of the most prevalent disease-carrying insects, may migrate as much as 20 miles; and the blowfly, important livestock pest, will migrate around 30 miles.

The physical evaluation program is carried out in the field and is designed to check the efficiency of various types of silver iodide generators, ie, whether they are actually producing silver iodide particles and in what concentration. Furthermore, it is necessary to determine under what weather conditions the silver iodide plume reaches the clouds and whether or not the silver iodide particles are effective in serving as freezing nuclei to form rain or snow.

In February of this year the Committee submitted its first report to President Eisenhower. In this report the Committee finds that cloud seeding of selected storms occurring during the late winter and early spring months and where the operations have extended over a period of 3 to 5 years, has produced an average increase of 9% to 17% in precipitation in the States of Washington, Oregon and California. Deep cool moist storms passing over the mountainous areas have yielded this additional precipitation in these states only.

Unfortunately these results *cannot* be assumed to apply to any other area of the country or to other seasons of the year. The Committee must continue its evaluation of rainfall data to determine what effect, if any, cloud seeding has in the interior mountain states and the flat land areas within the next two years.

It is of interest to summarize the results of the Committee's evaluation program to-date. It has found:

A. That super-cooled stratified clouds can be dissipated by aircraft seeding with dry ice or silver iodide.

B. That precipitation can be initiated by seeding warm cumulus clouds with water.

C. That dry ice and silver iodide seeding of cumulus clouds extending to 5,000 feet or more above the freezing line and with a temperature at the top of the cloud of -10°C. will induce precipitation.

D. That ground generator seed-

ing with silver iodide in the three Pacific Coast States has produced average increases of 9% to 17% under the conditions mentioned in an earlier paragraph.

E. That an intensive study of hail prevention and the possibility of reducing lightning seems well justified. Many destructive forest fires in the Western States are started by lightning strikes. It is believed that cloud seeding will start the precipitation process earlier and will prevent storms from building up to hail and lightning producing proportions. Much more study of this problem must be made before any final conclusions can be drawn.

F. That federal regulation of rain increasing operations is not justified at this time.

One of the most frequent questions asked is whether or not seeding milks the clouds of rain intended for other areas. This is the "robbing-Peter-to-pay-Paul" argument that has loomed large in the minds of many people in the West. They believe that rain increasing in upwind areas must necessarily cause less rain in the downwind areas. People in the Southwest who have suffered from severe droughts for a number of years have taken this argument very seriously.

The commercial cloud seeding companies, backed by current scientific opinion, argue that Nature is an inefficient rain maker and that probably not more than 5% of the total amount of moisture falls to the ground in an ordinary storm. By cloud seeding the efficiency may be increased 2% to 5% and this means that probably 90% of the total amount of moisture available passes on to the downwind areas.

Often the question is asked whether or not cloud seeding can break a drought. Unfortunately the answer is in the negative. From present knowledge of rain increasing, spotty and spasmodic efforts would not provide substantial relief nor help ascertain whether rain increasing measures are effective. Coordinated programs should be devised to cover large drought areas for extended periods of time.

It is easily understood why rain increasing has had a big impact on the nation particularly, but not exclusively in the West, where severe droughts and water shortages now exist. From an economic standpoint the Eastern and Southern States stand to realize greater benefits, dollar-wise, than the dry areas of the Southwest. Then when one considers the areas throughout the globe where water shortages exist, it is quite evident that rain increasing is not only a national problem but also an international problem of greatest importance.

Happy Wardens of the Jail Birds

Poultrymen are finding many advantages in cages for laying birds . . .

Condensed from Pennsylvania Farmer

Robert H. Williams

HEN CAGES went out of fashion 20 to 25 years ago and most poultrymen said "good riddance." Now they're back. Will they stay?

"There just isn't any other way to keep a flock," Dick Moyer says. He has 5,000 caged birds on the family farm in Union County, Pennsylvania, and has seven years' experience with floor birds to back up his statement.

Mr. Moyer is not alone in his opinion. To find out how these operations are faring, we sought out two other farmers who have thought enough of the idea to put up long cinder block installations and invest thousands of dollars in cages and equipment.

Charles Henninger, Dauphin County, is making a go of caged birds on a big scale. Henninger doubled the number of layers on his farm—from 5,000 to 10,000—without adding an acre or increasing brooding capacity. Half the birds are on the floor and half in cages.

Marvin Herr, the young Lancaster County farmer who spearheaded the revival of cages in the Northeast, also has no doubts that cages pay off. Mr. Herr started with a 1,000-bird plant in 1952 after visiting various cage operations around the nation. His egg production averaged 72 per cent on a cage basis and bird replacements ran about 80 per cent annually. This past year, with 5,000 birds housed in individual cages, his production ran 65 to 70 per cent. It takes about eight hours a day—all done by part-time help—to tend this operation.

Why are cages successful today after flopping so badly two decades ago?

1. Feed rations are better formulated today, thus birds do not have to scratch for balanced diet, the three men indicate.

2. Feed conversion is higher

Reprinted by permission from Pennsylvania Farmer, Pittsburgh, Pennsylvania

in modern cage operations. Dick Moyer says his floor birds produced a dozen eggs for each 4.8 pounds of feed. His cagers make a dozen eggs for each 4.6 pounds of feed. This doesn't sound like much until it is figured over a month's time. It comes to 340 more dozen eggs each month for the same amount of feed, or $136 more on the egg check in June alone.

Charles Henninger says he gets about 22 dozen eggs per 100 lbs. with his caged birds compared to 18 dozen from his floor flock.

"Caged birds just don't waste as much feed," the Dauphin County poultryman explains.

3. Labor costs have been slashed.

Old-timers did a lot of hand work. Today, Marvin Herr and his fellow cage operators have mechanized their chores. Mr. Herr, for instance, can feed all his birds in 20 minutes.

Modern house design makes these big savings in labor possible. Unlike the houses found in the South, Mr. Herr made his unit wide enough for four double rows of birds. The cement block house is 30 feet wide and stretches 450 feet across the field. A packing and egg room is located at the front of the building. Mr. Herr poured concrete aisles but left pits under the cages to catch the droppings. The earth floor in the pits soaks up the moisture while twin scoops attached to a narrow homemade tractor makes short work of the manure in the pits.

The houses on the other two farms are close copies of Herr's. However, Dick Moyer added a wrinkle that makes manure removal still easier. He installed a shuttle stroke barn cleaner across the width of his house. His twin scoops shove the manure directly into the barn cleaner. From there the manure is paddled out the side of the building and onto a waiting spreader.

Pit cleaning is a seven-hour chore each month at the Moyers. This includes spreading the manure on the corn land.

The clean eggs produced in the cage operation also simplifies chores. The eggs roll down the wire floor and lay out of the reach of the bird until collected. Dirty eggs are rare and quality is high because the eggs cool rapidly on the wire.

Mr. Herr warns that folks going into cage operation must consider cleaning and feeding chores. "Some conventional poultry houses must be remodeled," he says, "while some just aren't right for cages."

Mr. Herr's house produced 100,000 dozen eggs in 1955 from the 5,000 cages. Eggs run about 80 per cent large or better. According to the Lancaster County poultryman his production does

not vary 10 per cent the year around. He says cages eliminate broodiness, pick-outs and egg eaters. His mortality was only 6.4 per cent in 1955. And his price for culled birds was higher than in former years with floor birds.

"We catch birds before they go down in flesh," he explains.

How much does it cost to go into the business? Dick Moyer figures $6 per bird. That includes the pullet itself plus house, cage, other equipment and, in the Moyer's case, a hot air furnace installation. During the past winter, the Moyers kept their house at 50 degrees Fahrenheit despite some zero days. Fuel bill ran $164.35. The furnace also pays off in summer by circulating the air during hot, muggy days.

One-third ounce of antibiotic per ton of feed can boost pig growth 10 to 20 per cent.

Henninger keeps air moving in his house with seven 30-inch electric fans. They change the air in the house every two minutes in the summer and every three and a half minutes in the winter.

Both the Moyers and Henningers use double-roof construction to insulate the houses against extreme weather changes Henninger also installed double windows. Years ago poultrymen created serious ventilation and disease problems by cramming cages three deep in small houses. Today poultrymen stick to single tiers.

Culling is almost automatic. Each cage has a counting device. As eggs are collected the new egg is registered on the counter. Theoretically, the birds are culled each two weeks. Any bird that lays less than seven eggs in that 14-day period gets the axe. Mr. Henninger says the market price for large eggs influences his culling practices. If the margin between large and mediums is wide he may keep an old bird even if she does fall below the 50 per cent mark rather than replace her with a pullet. Feed price is also an influencing factor.

Dick Moyer doesn't cull pullets the first time they fall below seven eggs. Rather, such pullets go on the doubtful list for at least another two weeks.

Of course, a steady supply of replacements is needed to keep pace with the culling. Marvin Herr starts 1,000 birds, or 20 per cent of capacity, every three months. He follows a regular vaccination program and rears his replacements in confinement. When the young birds go into the house they are grouped in one section rather than sprinkled throughout the house. The Henningers and Moyers follow much the same replacement plan and find they can get by with about

one-fourth the brooding facilities required for floor flocks of the same size.

Cage operations have their problems, too: flies in the summer time, replacements and high investment.

One poultryman who is sticking to floor birds thinks he could build a mighty fine conventional laying house for the money poured into cage houses. "And it would be easier for both man and bird," he said.

Dick Moyer wasn't sure he would like to see an article about cage birds. "It might encourage others to get started in the business," he murmured. "Then we lose our advantage."

"We're only too glad to point out the disadvantages," we told him.

"That's the trouble," he said, "I just can't think of any big ones."

The Shrinking 1 Inch Board

For some months the lumber industry has debated the proper thickness of a finished 1 inch board. There seems to be a general feeling in the trade that the present inch board is too thick and should be thinned down a trifle.

A naive person might jump to the conclusion that a 1 inch board naturally would be 1 inch thick. That is not the case at all where finished lumber is concerned. In fact, for the last 30 years a standard inch board bought from a lumber dealer has been officially twenty-five thirty-seconds of an inch.

Now the American lumber standards committee has decided that inch boards should be only twenty-four thirty-seconds of an inch thick. In other words, one inch equals three-fourths of one inch, under the new specifications.

There are many practical reasons in the milling and lumber trade for adopting the new standard, according to experts. They have presented their recommendations to the department of commerce, which supervises such matters. The department will conduct a survey among interested groups and if these agree, the United States government will put its official approval upon the three-quarter inch.

All this is no doubt practical and necessary, but persons ignorant of the technical problems may ask if it wouldn't be simpler just to mark three-quarter inch boards as three-quarter inch boards and let it go at that. *From the St. Paul Pioneer Press*

A New Look at Winter Cover Crops

Winter cover crops are finding their place in Southern Agriculture. They make nitrogen and livestock feed . . .

Condensed from
The Southern Planter

Dr. E. R. Collins,
Extension Agronomist at North Carolina State College

A DECREASE in the use of winter cover crops in the south suggests a review of the advantages and disadvantages of their use.

1. Winter Legume Cover Crops Add Nitrogen To the Soil for Use By Following Crops.

Corn yields on a Norfolk fine sandy loam soil averaged 6.4 bushels with no cover crop and no nitrogen side-dressing. This was an average of 9 years. The yield was increased by 67 bushels to a total of 73.4 where an average of 2,413 pounds of dry legume vegetation was grown and turned under annually.

Ninety-five pounds of commercial nitrogen (N), without a legume cover crop, produced 2.5 bushels less than the corn following the legume cover crop; 195 pounds of commercial nitrogen produced 10.5 bushels more than the corn following the legume cover crop. Ninety-five pounds of nitrogen (N) can be supplied by 464 pounds of a 20.5 per cent nitrogen material, or the equivalent from other sources; 195 pounds of nitrogen (N) by 950 pounds of a 20.5 per cent nitrogen source.

The return from the expenses of legume seed, seeding, and other costs will be related to the amount of legume vegetation turned. This cost should be balanced against the cost of the amount of commercial nitrogen that would produce an equivalent yield.

2. Winter Cover Crops May Make Minerals More Available and Build Up the Organic Matter Content of the Soil.

On the experiment mentioned above, there was a big decrease in the organic matter content where no vetch was turned nor nitrogen added. The organic matter content decreased less where high rates of nitrogen side-dressing were used. The decrease was still less where vetch

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had been turned alone or with high nitrogen sidedressing rates.

These advantages must be considered in evaluating the long-time effects of both nitrogen side-dressing and winter cover crops. For example, it has been reported that organic matter is important by increasing phosphorus availability.

3. Winter Cover Decreases Erosion Losses.

Erosion losses are decreased by the winter cover crop when there is sufficient growth before cold weather and this cover is permitted to remain on the land long enough in spring to be effective.

Results from North Carolina show that most of the soil loss due to water occurs in the summer. This is due to the high intensity type of rainfall and to crop tillage. Winter cover crops are of little benefit in this period unless undecomposed material is left on the surface.

4. Winter Cover Crops Can Conserve Nutrients Through Reduction of Leaching Losses.

Many of the sandier Southeastern soils are subject to leaching during the winter months. A winter cover crop, seeded early in the fall to establish a good stand and growth, takes up and conserves some of the nutrients which otherwise might have been leached from the soil. This becomes an economic consideration as to the relative cost and effectiveness of the cover crop in comparison to the nutrients saved from leaching and the loss from wind or water erosion.

Non-leguminous cover crops were found in general to be of little value in corn, cotton and tobacco production; also of questionable value in peanuts. Turning non-leguminous cover crops may be detrimental if adequate nitrogen is not applied. This assumes adequate phosphate and potash fertilization for the cash crop.

5. Winter Cover Crops Can Provide Valuable Winter Grazing for Livestock

When winter cover crops are planted early in the fall to establish good growth and cover, this grazing can contribute materially to a livestock feeding program.

6. Winter Cover Crops May Build Up Diseases, Insects and Nematodes.

Consideration should be given in selecting the kind of winter cover crop to be used to minimize diseases, insects and nematode problems on the cash crops to be grown on the land.

7. Winter Cover Crops Can Interfere With Obtaining A Stand of the Following Crop.

Heavy growths of winter cover crops should be turned 10 days to two weeks before planting a

crop. The decomposing cover crop frequently results in unfavorable conditions for obtaining stands.

Unfortunately, damage from wireworms and insects is sometimes increased following winter cover crops, and on soils in which the organic matter content had been raised.

8. Winter Cover Crops Have A Place On Many Farms.

It would appear that cover crops could be used to the best advantage to supply nitrogen for the following crop and to supplement the fall, winter and spring feed program. High nitrogen fertilization to the corn crop can replace much of the nitrogen, and through greater growth of vegetation, can replace part of the organic matter furnished by the winter cover crop.

Each farmer should analyze his own farm situation to evaluate the relative cost of nitrogen through winter legumes in comparison to commercial nitrogen; also, his distribution of labor which will permit him to get winter cover crops planted in time to establish a stand and cover before cold weather.

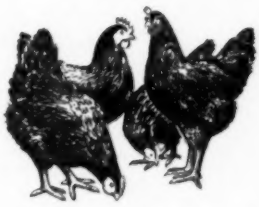
The advantages of winter cover crops must be weighed against the difficulties sometimes encountered in obtaining a stand of the following crop, and the probability of building up diseases, insects or nematodes.

Factors to consider in obtaining the greatest advantages from winter cover crops are: Adequate liming, fertilization, inoculation of legumes, relatively early seeding, and turning a week to 10 days before planting.

"One on the House"

A Chicago liquor store sends these cards to clients and prospects: "Since you cannot refrain from drinking, why not start a saloon in your own home? Be the only customer and you will not have to buy a license. Give your wife $55 to buy a case of whiskey. There are 240 drinks in a case . . . Buy all of your drinks from your wife at 60c a drink and in 12 days (when the case is gone) your wife will have $89 to put in the bank and $55 to buy another case . . . If you live 10 years and continue to buy all your whiskey from your wife and then die in your boots, your widow will have $27,085.47 on deposit . . . enough to bring up your children, pay off the mortgage on the house, marry a decent man, and forget she ever knew a bum like you."

Sun May Cool Tomorrow's Poultry House



Here are some exciting developments which promise great things for the poultryman in the not too far distant future . . .

Condensed from
Everybody's Poultry Magazine

W. Everett Eakin

TORRID heat waves from the summer sun each year take a heavy toll in poultry mortality, reduced egg production and stunted broiler growth.

Yet, strange as it may seem, there are promising possibilities that these same heat rays of the sun may be utilized to provide the conditions necessary to minimize this terrific blow to the poultry industry each summer.

The utilization of the sun's energy for summertime cooling of the poultry house is but one of the many scientific advancements promised in the years to come.

Other great strides are expected to be made (1) in controlled environment, (2) in greater automation to reduce chore time, and (3) in improved materials—all of which will contribute to mass production, more efficient management and greater profits.

Those who adopt the most efficient methods with labor saving devices, and provide controlled environment along with improved nutrition and breeding will stay in business. The less efficient poultrymen will be weeded out.

The poultry industry today is in a state of flux. Many new ideas have been introduced to improve efficiency, hold down costs and provide better environmental conditions. The successful poultrymen will be those who decide correctly which of these ideas are practical, and which are fads that soon will pass out of the picture.

Heavy investments in buildings, mechanical equipment and good birds are necessary. If the wrong system of management, type of equipment or breeding strain is chosen, heavy losses may result.

Research in Housing

In the past few years greatest advancement has been made in breeding and nutrition. However, today more research attention is being given to poultry house and labor saving devices. The burden now falls upon the groups responsible for poultry

Reprinted by permission from Everybody's Poultry Magazine, Hanover, Pa.

equipment, building materials, ventilating systems and kindred fields to provide the most desirable surroundings for these well-fed, well-bred birds.

Already considerable knowledge has been accumulated in the utilization of the wintertime sun in the poultry house for removal of excessive moisture and in the maintaining of more even temperatures.

Dr. Glenn O. Bressler at Pennsylvania State University has taken the lead in this field. He also has pointed the way to new development in automation in the poultry house, combining poultry house research with the more efficient use of equipment and controlled ventilation.

Effects of Bressler's research can be seen in both this country and abroad. Already solar type poultry houses, using the principles established at Penn State, may be found in almost every cold weather state in this country east of the Rocky Mountains, even in Europe and Australia, with plans for construction of similar buildings in South America and Canada.

New advances are also coming in cooling poultry houses of the future. Cue to the possible use of the infrared or heat waves of the summer sun for cooling came out of the world conference on solar energy utilization in Arizona, last November.

Reports on the conference indicate that the sun's energy already is being used experimentally in some cooling devices. This energy is used to compress the refrigerant on the same principle as the gas refrigerator where gas heat is required.

Perhaps in another five on 10 years a solar heat collector will be on the roof of the poultry houses to trap the sun's energy in the summer for the cooling apparatus and in the winter to furnish heat for the chick brooders, or even to heat the farm house or other buildings.

The discount on an overweight 300-pound hog applies to the first 200 pounds as well as to the extra 100 pounds.

This may sound like a Rube Goldberg idea today, but go back five or six years ago to the time when you first started to read about using the sun heat for moisture removal in the poultry house. Today using the winter sun heat is not a dream but a reality, and the idea is spreading rapidly.

Sun Runs Phones

The sun's energy is being used also in the operation of rural telephone lines, being stored in special batteries. Solar distilleries are being set up in arid lands to convert salt water from the

sea into fresh water. Low cost solar cookers also are being developed.

Present methods of mechanical cooling of poultry houses appear to be too expensive, so perhaps the solar heat cooling system may be the answer if costs can be reduced. A dozen state land grant agricultural colleges have started research on summer cooling of poultry houses. Out of this already has come the indication that air conditioning units designed for residential use are not practical in poultry housing. They must be redesigned.

Here are some of the drawbacks:

1. There's just too much air space to be cooled for a one-half or three-quarter ton unit.
2. Recirculating the air to reduce the cooling load results in the filters becoming clogged with dust in a matter of several hours.
3. Ammonia fumes build up rapidly. As the air is cooled, moisture is released, increasing the moisture problem.

In the field of controlled environment, rapid progress can be expected in the year-around ventilation. There is growing favor for the pressure system of ventilation as against the exhaust system, but precautions have to be taken that too large fans are not used. It's better to use more smaller ones, along with baffles at the air intakes.

New Equipment Ahead

Although rapid strides have been made in the past several years in labor saving equipment, look for even greater improvements in the next several years. Manufacturers are coming out with pit cleaners. The tier roosts are forcing new developments in feeders and waterers.

A start has been made in mechanical conveyors for egg collections. Look for more attention to be given to this equipment, with perhaps an egg stamping machine to stamp the date the egg is laid as it moves along the conveyor system from the nest to the cooling room.

Within a couple of years all poultry house plans will include provisions for an egg cooling room, resulting in a great improvement in egg quality—and a tremendous increase in egg consumption.

Count on better knowledge on the utilization of building materials. This will take two directions:

(1) Performance — Longer life and contributing to improved environmental conditions by reducing heat transfer through the building materials. This will result in warmer, more even and dry environment in winter, cooler in summer.

(2) Labor Saving — Development of building materials which can be installed at less cost on

a per-square-foot basis. As an example, the quarter-inch tempered Presswood board of Masonite which comes in panels four feet wide and in lengths up to 16 feet. This will cut installation costs.

In masonry construction, look for materials with greater insulating value. A new foaming substance to put into concrete is reported in the research stage, making it possible to get more dead air space, thus increasing the insulation. Greater insulation in cinder block construction can be expected also.

Look for more educational work on the part of building material manufacturers to keep poultrymen informed on how to use the various products to the greatest advantage.

For instance, one insulation manufacturer now points out that the principal summer heat gain through the roof comes from the sun which can heat the roof surface to 165° F. This heat in turn is reradiated from the underside of the roof sheathing to the insulation and ceiling below. The insulation stops as much as possible, but it can not stop all this heat movement.

By designing the building so that there is a continuous and permanently vented space between the insulation and the underside of the roof deck—as was done at the Penn State solar poultry house—the heat input into the building in summer can be reduced, regardless of the amount or type of insulation employed.

If this space is vigorously ventilated, as by mechanical means, the temperature within the attic space will be considerably lowered and the insulation has a relatively easy job to perform. If there is no venting of the air space above the insulation, there may be trapping of moisture under winter conditions, causing rotting and loss of insulating efficiency.

The Libbey-Owens-Ford Glass Co. for the past several years has carried out an extensive advertising and educational program in the farm press on the proper placement of Thermopane insulating glass windows to trap the wintertime sun heat and to shut out the hot summer sun. This has provided better environmental conditions for poultry, and better working surroundings for the poultryman himself.

Certainly the poultryman of tomorrow, to stay in business and make a profit, is going to have to watch developments in poultry housing closely—not only the new equipment, materials and products of industry and the research of the agricultural colleges, but also the trends on America's privately-owned poultry farms.

Sesame . . a Promising Crop

Development of non-shattering strains has made a profitable new crop. Nets up to $64 per acre . . .

Condensed from Texas Livestock Journal

"OPEN, SESAME," the ancient magic phrase that swung aside the door of Ali Baba's cave, is being brought up to date as modern wizards work on the formula for "Stay Closed, Sesame," password to a prospective new treasure trove in the form of a major cash crop for Southern farmers.

Sesame, one of the first oilseed crops cultivated by man, has been used as a food source for more than 3,000 years in India and Asia. In recent years commercial production has been undertaken in Latin America. But until 1953 there were no large-scale plantings in the United States.

An erect annual plant averaging about 40 inches in height, sesame has plump, hairy pods growing the entire length of the stem between broad leaves which fall off at maturity. Each pod contains between 75 and 100 small seed similar to flax.

Chief characteristic of the seed pod is that it casts out its seed at maturity (probably the origin of the Arabian Nights "Open, Sesame" phrase). Hand harvesting of the sesame crop was always necessary in the past because of this characteristic. Pods up and down the tall stalks ripened at different times, burst and shattered, losing the seed if not gathered at just the right stage. So, although sesame was grown in the Southeastern States as early as the end of the 17th century by Negro slaves who brought seed with them from Africa, sporadic attempts to put the crop into commercial production during the past quarter century in Kansas, California, Arizona and South Carolina were not successful because of the excessive hand labor required.

It took a quirk of nature—a mutation in the heredity make-up of the plant—plus the fortunate circumstance that an American geneticist happened to be on the scene and recognized the importance of this quirk, to start the breeding improvement process which promises to make possible the transformation of sesame from a crop grown only in the economically retarded areas of the world, where human

Reprinted by permission from Texas Livestock Journal, San Antonio, Texas

labor is cheap, to a crop suitable for the highly mechanized agriculture of the United States.

In 1943, D. G. Langham, an American geneticist working in Venezuela, discovered a single plant on which the pods remained closed after the plant dried at maturity. The plant with this highly desirable trait also had many undesirable characteristics which made it worthless for commercial production. But Dr. Langham saw the possibilities of crossing this mutation with other types of sesame to produce strains which would be satisfactory producers of seed and oil and at the same time would keep the characteristic of closed pods to make mechanical harvesting possible.

"Dehisce" is the technical term for the popping open of the seed pods. Thus the new discovery was an "indehiscent" type. Seed of this type were brought from Venezuela to the United States in 1946-48. At Dr. Langham's suggestion, J. A. Martin of South Carolina began in 1948 to make a series of multiple crosses (hybrids) involving as many as 32 parental strains with indehiscence introduced through some of the parents. Selections from these crosses gave breeding material for an intensive research program which has culminated in the production of Rio, a new non-shattering variety described as "completely adapted to mechanical harvesting."

Other work has been under way on sesame since 1947 at the privately endowed Texas Research Foundation. The Foundation has produced two "semi-shattering," or improved dehiscent strains—Renner No. 1 and Renner No. 2—and has encouraged the planting and marketing of sesame in the Blackland area of Texas. The crop was grown on 10,000 acres in the 1954 planting season. With the release of the Renner No. 2 strain a greater expansion is expected. Dr. E. H. Collister, who directed the sesame improvement work at the Texas Research Foundation, describes Renner No. 2 as superior in every major respect to the No. 1 strain—more drouth resistant, with heavier yield, earlier maturity and less shattering.

Sesame production in Ellis County, Tex., is proving a cash crop second only to cotton in per acre net income. Using the Renner No. 1 variety, farmers in 1955 harvested 235,000 pounds of cleaned seed from 290 acres diverted by law from cotton production.

The Ellis County sesame was grown under contract for the Texas Sesame Seed Growers, a private enterprise production and marketing association at Paris, Tex. The association transported the sesame by truck to the clean-

ing and processing plant at Paris and is marketing the seed for growers.

The farmers already have received $16,450 for their sesame. Nine cents a pound will raise their gross incomes to a total of $21,150. The full 10 cents a pound will assure them of $23,500, average of $81.03 in per-acre gross income.

Sesame improves the physical structure of the soil and has a short growing season. It can be planted as late as 30 days after cotton planting. And, like cotton, it is a dry weather crop.

One grower explained that sesame land was looser, more mellow and easier to plow than cotton and corn land. Cotton on his 414-acre farm did better this year on sesame land than cotton did on land after other row crops.

A. Y. Mohundro, Jr., another sesame grower, San Antonio, saw two major drawbacks to sesame as a crop: its semi-shattering nature and its early maturity date. He agreed on sesame's desirable points as a cash crop, especially on its ability to improve the soil. "The stalks rot in a hurry after they've been mulched with a harrow," he added.

Mohundro figured his net profit at $35 an acre on 22,000 pounds from 35 acres; $43 on 4,000 pounds from six acres; and $64 an acre on 6,000 pounds

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from five bottomland acres, all computed on the seven cent base. His highest yield was on the bottomland—1,200 pounds an acre.

Yields of the improved dehiscent strains have varied from 300 to 1,500 pounds per acre. The low yields resulted from inexperience with the crop, especially its tendency to shatter during threshing. The average is expected to stabilize at about 700 pounds per acre.

Seeding rate is 1½ pounds to the acre. The seed is planted about three inches apart in three foot rows, either from an adapted corn planter or vegetable planter. Two cultivations for weed control are usually required. The plant is self defoliating. When the leaves fall and while the pods are still somewhat green, the dehiscent types must first be cut with a binder, shocked and allowed to dry in the shock. The sesame is then threshed either by a portable threshing machine or a combine fitted with flax or lespedeza screens. About two weeks is usually required for drying. Most seed loss is at the combine during threshing. Farmers have rigged up various devices to catch the seed during handling. One of these is a canvas-covered platform on which the shocks are thrown before being fed into the combine. This is dumped on the apron period-

ically and the seed goes through the machine.

Rio, the new non-shattering variety released jointly by the Texas Agricultural Experiment Station and the USDA, can be cut with a windrower, allowed to dry and then combined directly from the windrow. Rio is described by experiment station research scientists as better adapted to Texas growing conditions than other strains of non-shattering sesame, but the scientists say it is expected to serve only until still better varieties are developed in an extensive sesame breeding program. Seed yields of Rio in experimental plantings at College Station have ranged up to 1,489 pounds an acre under favorable growing conditions. Rio produces slightly higher yields under favorable conditions and lower yields under poor conditions than the shattering types. It also matures later than the shattering varieties now grown.

Sesame is not a poor-land crop; it grows best on fertile, well drained soils. Heavy applications of commercial fertilizers are required for satisfactory production on soils of low to moderate fertility. Sesame should not be planted until cool weather is past.

Sesame seeds are sweet and oily, with a nut-like flavor, and will keep almost indefinitely even in the tropics. Whole sesame seeds are used in the baking industry in the United States, which has been taking the major portion of about 7,000,000 pounds imported anually in the past, but the best prospects for a mass market are expected to lie in oil and meal from crushed seeds. Sesame oil has a bland, pleasant flavor and is easily processed and refined. In Latin America it is considered the "queen" of the vegetable oils. Its keeping qualities are outstanding. A minor constituent, sesamolin, contains a powerful antioxidant and causes sesame oil to stay non-rancid much longer than the more familiar vegetable oils. Researchers have found that while heat treated cottonseed oil remained stable 180 hours, sesame oil remained stable 1,926 hours.

Thus food products made from sesame oil such as salad or cooking oil, shortening and margarine will stay fresh for a long period. The oil also has uses in paints, cosmetics, insecticides and for medicinal purposes.

Sesame oilseed meal is, like the whole seed, a rich source of protein, calcium, phosphorus and the vitamin niacin, and makes a high grade feed for livestock.

With establishment of stable markets and continued improvement of sesame strains for easier harvesting, enthusiasts believe this crop can become an important source of cash income to farmers in the Cotton Belt.

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